The University of Chicago

FUNCTIONAL PATTERNS IN THE GUADALUPE COUNTIES OF THE EDWARDS PLATEAU

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BY
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FOREWORD

The center of interest in this dissertation is the functional patterns of the Guadalupe Counties in the Edwards Plateau. Emphasis is placed on the inherent characteristics of the patterns, both in their cultural forms and in their natural features. The primary objectives of the study are to discover in what ways and to what extent (1) the cultural forms are related to the natural features, and (2) the complex of interrelated cultural and natural patterns serves the major functions of the area. In order to attain these objectives, attention throughout is focused on the use of land and other resources.

For a study of this kind, the Guadalupe Counties have several advantages. In addition to being statistical units, the counties in the Edwards Plateau section closely approximate the natural unit formed by the upper Guadalupe River basin. As a result they include the three types of surface characteristic of the eastern Edwards Plateau, terrace land, rough hills and ridges, and divides. On this base a type of ranching has developed that is unique in the country, including as it does cattle, sheep, and angora goats on one range under one management. The resort industry adds variety to the employment structure. There are sanitariums, guest ranches, boys' and girls' camps, and resort hotels. Along the eastern or downstream border of the area the plateau drops off to the Black Prairie, and the farming pattern, which had been largely confined to the river lands, dominates the landscape. All this rural variety is reflected in the towns, which thus become integral parts of the region.

In view of the large size of the area, a technique of sampling and traverses was employed to obtain coverage. After a reconnaissance trip through the length of the Guadalupe Counties, and into four adjacent counties on the northwest and west, traverses were made along the roads for the recording of both natural and cultural features. To obtain significant detail on the plan and functioning of the major pursuit patterns, the four chief towns, together with several minor towns, were mapped and sample studies were made of representative enterprises and institutions, and similar sample studies with maps were made of ranches, farms, and resorts. Throughout the field work all available maps and aerial photographs were used in conjunction with field observation, and 470 photographs were taken as a pictorial record of the natural and cultural features of the area.

Additional information was obtained from libraries and government offices. The library resources of the University of Chicago were used both previous to and following the field work, and the University of Texas library was consulted on the way to the field as well as on the return trip. In Austin, state agencies such as the Texas State Board of Water Engineers and the Texas State Highway Department, and federal agencies such as the Bureau of Reclamation and the Bureau of Agricultural Economics were particularly helpful. In the Guadalupe Counties, valuable information was obtained from the county officials and from the local offices of the Soil Conservation Service and the Production and Marketing Administration. On the return from the field several days were spent in examining materials and conferring with range specialists in the regional offices of the Soil Conservation Service at Forth Worth.

The information on which the study is based was gathered by field work during the winter of 1947-48, and by library research in the fall of 1947.

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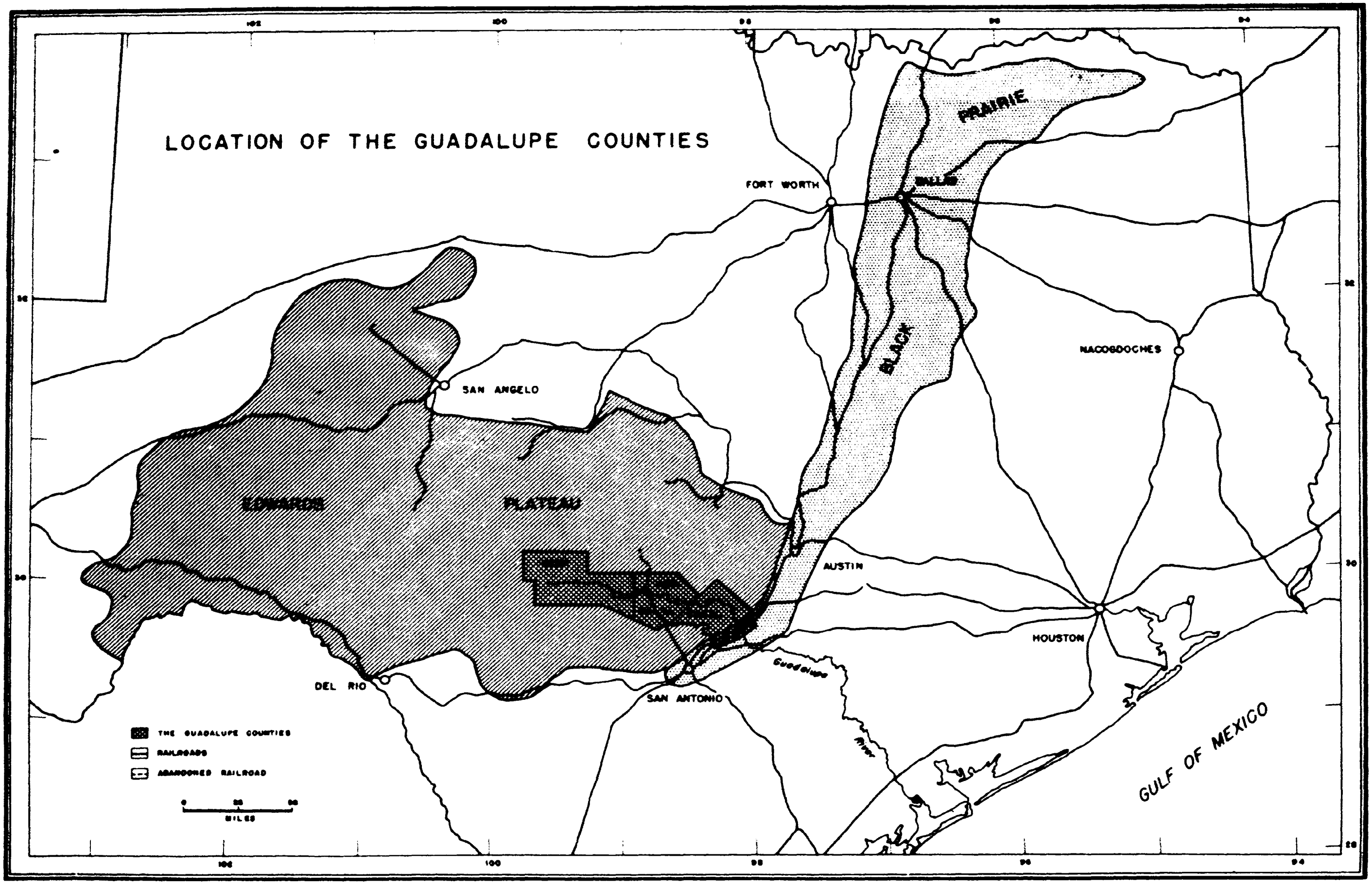

LOCATION OF THE GUADALUPE COUNTIES
FORT WORTH
DALLAS
PRAIRIE
BLACK
NACOGDOCHES
SAN ANGELO
EDWARDS
PLATEAU
AUSTIN
HOUSTON
DEL RIO
SAN ANTONIO
Guadalupe
River
GULF OF MEXICO
THE GUADALUPE COUNTIES
RAILROADS
ABANDONED RAILROAD
0
25
50
MILES
102
100
98
96
94
104
32
30
28

Figure 1

the Guadalupe resorts.

Standing below the escarpment at the southern end of the Black Prairie, San Antonio is the metropolis for a large area of central and southern Texas, including the counties along the Guadalupe River. It is the shopping center, and the focus through which most of the wool and tourists are channeled by the transportation routes, although they may not halt in passage. San Antonio also serves as the packing and shipping center for the counties' livestock. A further evidence of its influential position in the Guadalupe Counties is the fact that it supplies their daily newspapers.

Away to the north, at the head of the Grand Prairie stands Fort Worth, formerly the destination of many of the livestock shipments from the Guadalupe Counties, but now displaced by San Antonio as the primary marketing center.

The relations of the Guadalupe Counties with the neighboring regions are not restricted to the functioning of the livelihood patterns, but extend to physical patterns as well. The upper watershed of the Guadalupe River, which lies within these counties and the adjacent hill country, is the source of 80 per cent of the Guadalupe floods, while the greater part of the damage is sustained by the counties below the Balcones Escarpment.[1] On the other side of the ledger must be entered the fact that the Guadalupe Counties are also an important catchment region, supplying the runoff and feeding the springs which contribute much to the river's perennial flow below the escarpment.

The physical characteristics which give personality to the Guadalupe Counties are in part similar to those of the adjacent country and in part peculiar to the area. The Comal Prairie resembles the whole of the Black Prairie in its deep soils, mantling long slopes which are in places rolling and in places nearly level (Figs. 6 and 7), but the Comal Prairie differs from the main mass of the province in possessing a somewhat drier climate.[2] The Balcones Escarpment, a particularly well marked landscape feature in Comal County, is the site of the renowned Comal Springs, which

---

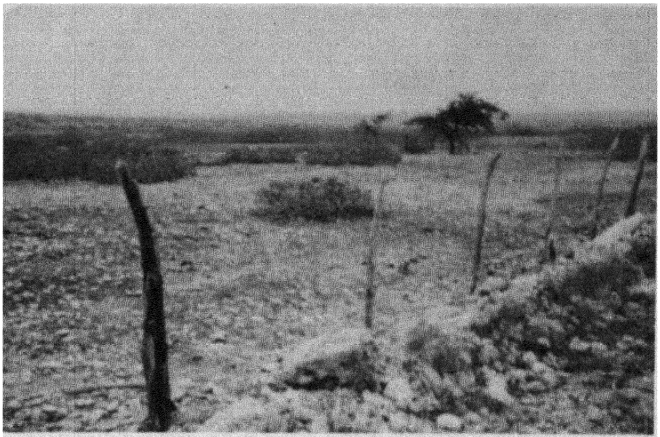
[1] U.S. Congress, House of Representatives, Guadalupe River, Texas, House Document No. 238, 74th Cong., 1st Sess. (Washington: Government Printing Office, 1936), p. 48.

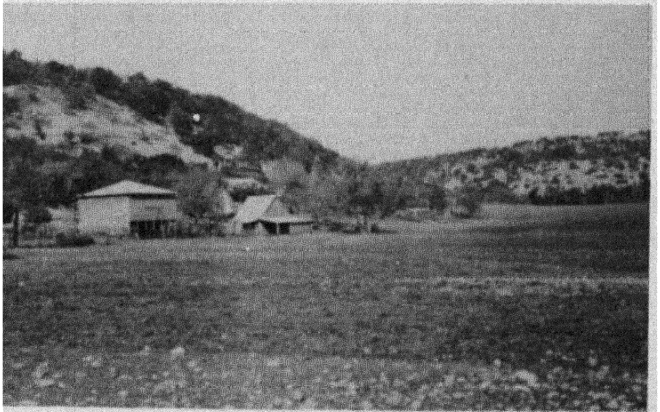
[2] C. W. Thornthwaite, "An Approach Toward a Rational Classification of Climate," Geographical Review, Vol. XXXVIII (1948), see map "Moisture Regions in the United States" following p. 94.

Fig. 2.--Land Types: The Divide, or main summit region of the Edwards Plateau, which is largely undissected. Its elevation in western Kerr County is about 2,200 feet. This view shows the low-growing shin oaks, which have shed their leaves in contrast to the taller liveoaks, and a typical fence of the sheep and goat country with four stays between the two fence posts to spread the taut wires.

Fig. 3.--Land Types: The Hill Country, or dissected part of the Edwards Plateau which lies east of the summit region and makes up the greater part of the Guadalupe Counties. The hill crests in this view in Comal County are at an elevation of about 1,000 feet, and the valley floor in the foreground, at about 800 feet. The latter landform is a terrace into which the Guadalupe has incised its present channel more than twenty feet. Not only is this association of slope and terrace lands common in the Hill Country, but also the location of the ranch headquarters at the juncture of the range and arable land is quite characteristic.

Fig. 4.--Shallows along the upper Guadalupe River. Like other rivers in limestone country, the Guadalupe in the Hill Country alternates wide shallows with deep pools.





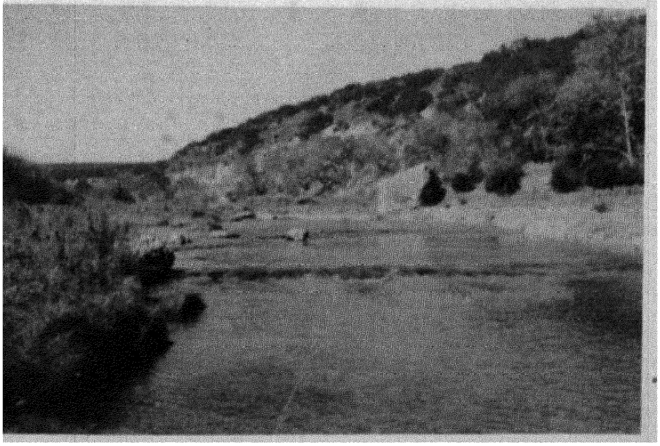
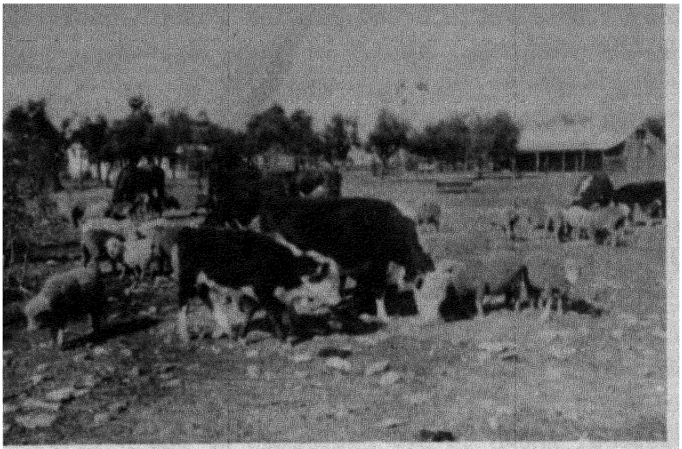
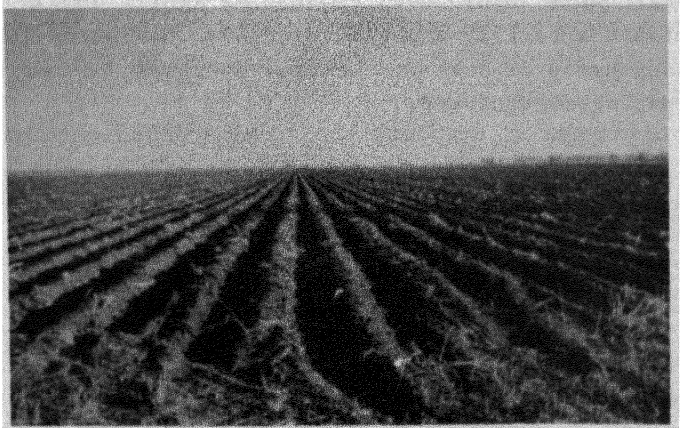


Fig. 5.--Typical livestock of the Edwards Plateau. Hereford cattle, fine-wool sheep, and angora goats are herded together in fenced pastures. These animals have come to the ranch headquarters for the feed which tides them over the winter. The liveoaks in the background have been grazed as high as the stock can reach.

Fig. 6.--Land Types: The Black Prairie, level phase. This wide terrace of the Guadalupe lies north of the river in Comal County.

Fig. 7.--Land Types: The Black Prairie, rolling phase. More of the Comal Prairie resembles this area, southwest of New Braunfels, than the level terrace shown in Fig. 6.





have a flow of over 200,000,000 gallons a day.[1] Several other similar groups of springs appear at intervals along the escarpment, but the Comal Springs have the distinction of being the largest.[2] The dissected margin of the Edwards Plateau, locally known as the Hill Country,[3] resembles the remainder of this broad border strip in possessing rough hills of moderate height grouped in dendritic patterns around valley flats (Figs. 3 and 4). The Guadalupe plaza canyon is one of several notable expanses of valley land, the Pedernales, the Medina, and the Blanco canyons being the sites of comparable displays. In climate, the Guadalupe Hill Country takes its place near the east in a gradation from the subhumid east to the semiarid west.[4] The undissected portion of the Edwards Plateau, known to its residents as the Divide,[5] enters the Guadalupe Counties only along the western margin of Kerr County (Fig. 2). This thin-soiled expanse of gently undulating terrain maintains a similar appearance across the county line into the adjacent parts of Real and Edwards counties, although its rainfall decreases westward.

The Gross Functional Structure

The characteristic patterns of the livelihood activities, like those of the physical base, have elements which resemble the contiguous areas and elements which are distinct. Farms on the Prairie[6] are concerned with the production of grain crops and livestock, principally cattle. Although this form of activity has been increasing throughout the Black Prairie, the virtual disappearance of cotton from the agricultural scheme in Comal County carries the trend farther than in the adjacent Guadalupe County, where cotton production is still of some importance. Ranches in the Guadalupe Hill Country clearly fit the prevailing occupance pattern of the Edwards Plateau, combining as they do goats, sheep, and cattle on their pastures (Fig. 5). However their smaller average size and their frequent inclusion of significant quantities of feed crops in the scheme of operations identifies them with the type of ranching found in the eastern part of the plateau. In the Divide country beyond occurs a transition to the type of ranching characteristic of the western Edwards Plateau. Larger properties and a lower proportion of cultivated land are its more prominent features. Occupying much less space than ranching, but nonetheless contributing significantly to the livelihood structure of the Guadalupe Hill Country is the resort industry. Though it is well established in the neighboring counties also, in the Guadalupe Hill Country a high concentration of boys' and girls' camps, two large government hospitals, and two religious encampments are distinctive features. Another basic element in the livelihood structure of the Guadalupe Counties is manufacturing. New Braunfels, the Comal county seat, has several manufacturing plants among which a cotton textile mill, hosiery mills, and grain mills are important. Nearby, two large quarries add to the resources of the city's trade area. Commercial and service establishments are concentrated in the towns and villages which are spaced irregularly through the counties (Fig. 8).

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[1] W. C. George, W. W. Hastings, and S. D. Breeding, "Geology and Ground Water Resources of Comal County, Texas" (Austin: Texas Board of Water Engineers, 1947), p. 36.

[2] Ibid.

[3] In this dissertation "Hill Country," when capitalized, will refer to the portion of the dissected Edwards Plateau within the borders of Comal, Kendall, and Kerr Counties. Uncapitalized it will denote the whole of the dissected plateau rim, or a portion of it outside of the Guadalupe Counties.

[4] Thornthwaite, op. cit., see map referred to above.

[5] "Divide," when capitalized, will refer to the undissected portion of the Edwards Plateau found in the western part of Kerr County.

[6] The term "Prairie," when capitalized, will refer to the portion of the Black Prairie in Comal County.

The Transportation Pattern

Because the transportation pattern is indissolubly linked to the past development and present functioning of all the rural and urban livelihood patterns, it is the first of the functional patterns to be discussed. Its most prominent members are the railway and highway systems. In the highway network there are both interregional routes by which the Guadalupe Counties are connected with the rest of the country and roads designed primarily for intraregional travel. Though all the railroad lines function predominantly in the interregional traffic, some are main lines while others have only local importance.

Of the two transportation patterns, the railroad pattern is the simpler (Fig. 8). Two main lines traverse Comal County, running on the Prairie near the base of the Balcones Escarpment.

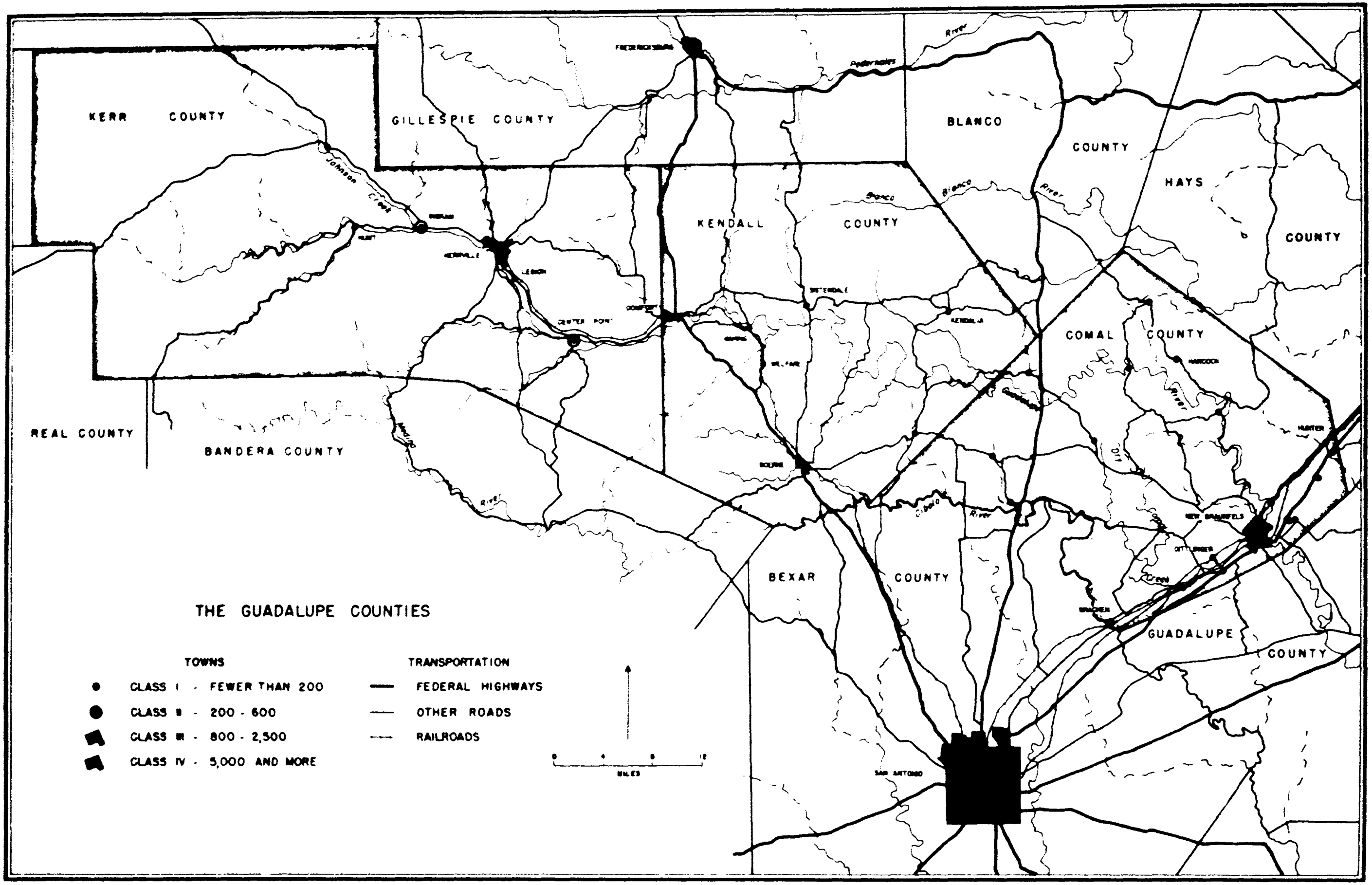
KERR COUNTY
GILLESPIE COUNTY
BLANCO COUNTY
HAYS COUNTY
KENDALL COUNTY
COMAL COUNTY
BEXAR COUNTY
GUADALUPE COUNTY
REAL COUNTY
BANDERA COUNTY
FREDERICKSBURG
Pedernales River
Blanco River
Johnson Creek
INGRAM
HUNT
KERRVILLE
LEGION
CENTER POINT
COMFORT
WARING
WELFARE
SISTERDALE
KENDALIA
BOERNE
HANCOCK
HUNTER
NEW BRAUNFELS
Dry Comal Creek
River
Cibolo River
Medina River
BRACKEN
SAN ANTONIO
THE GUADALUPE COUNTIES
TOWNS
CLASS I - FEWER THAN 200
CLASS II - 200 - 600
CLASS III - 800 - 2,500
CLASS IV - 5,000 AND MORE
TRANSPORTATION
FEDERAL HIGHWAYS
OTHER ROADS
RAILROADS
0
4
8
12
MILES

Figure 8

Locally the route takes advantage of the low grades along the Dry Comal Creek, avoiding the spurs of a range of hills on the Prairie near the county line. Regionally the route is a segment of the lines which link the Dallas and Fort Worth transportation hubs with Austin, San Antonio and the Rio Grande. Its course shows the barrier effect of the compact mass formed by the Edwards Plateau, which characteristically is encircled rather than crossed by railroad lines. The exception is the railway traversing the narrow northern base of the plateau west of San Angelo (Fig. 1). Beyong the limits of Comal County, the two main lines, belonging respectively to the Missouri Pacific and the Katy systems, are linked eastward to Houston and, by way of San Antonio, to areas south and west.

North into the Guadalupe Hill Country, only one branch line survives, that extending from San Antonio through Boerne and Comfort to its terminus at Kerrville. Just as avoidance by main lines is characteristic of the plateau, so is penetration by short branches (Fig. 1).

The Kerrville branch makes its way into the area through valleys where possible. Forced to cross the grain of the country north of Boerne, it ascends a south-flowing stream and crosses a divide into the course of the largest and most direct north-trending valley. Transferring to the broad Guadalupe terraces in the vicinity of Waring, it follows them to its terminus at Kerrville, although low, rocky spurs extend across its path in several places.

In the Guadalupe Counties the railroad has lost its earlier critical importance through competition from motor traffic on the highways. Especially is this true of the Hill Country, where the roads have not only taken on many of the functions formerly reserved to the railroads, but in addition are substituting for pipe lines. An evidence of this declining importance of the railroad is the abandonment of the Fredericksburg and Northern, a twenty-four-mile branch line that extended from the Texas and New Orleans (now of the Southern Pacific System) between Waring and Comfort up the Black Creek valley and by tunnel through the intervening divide to Fredericksburg (Fig. 1). At the time of its construction in 1912, this was the only railroad tunnel in Texas.[1] The line was sold and the rails removed during World War II. Further evidence is the transference of all passengers and mail service from the Kerrville railroad to the highway. The Kerrville Bus Company handles both passengers and first class mail.[1] However, the bulk of the mail along with parcel post and express comes by special van trucks.[2] The railroad still retains a part of its business in the transportation of petroleum products, but trucks also carry an important amount. In the transportation of butane and propane, which are used both by town systems and by rural households, the highway substitutes for a pipe line, the entire supply arriving by truck. In addition, certain types of freight, such as livestock now move by truck almost exclusively. A special form of truck trailer which can be double-decked for sheep and goats is used extensively for the transportation of stock, though it is adapted to the handling of other commodities as well.

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[1] S. G. Reed, History of Texas Railroads (Houston: St. Clair Publishing Co., 1941), p. 450.

As would be expected from its multiple functions, the road pattern is much better developed than the railroad pattern. Three federal highways fan out northwest, north, and northeast from the San Antonio hub, traversing two of the counties (Fig. 8). The five state highways extend this radiating pattern, and add an occasional crosspiece between spokes. County roads elaborate the design to complete a network which focuses regionally on San Antonio, and locally on the chief towns of the Guadalupe Counties. From five to seven roads lead out from each of the latter.

The routes followed by the highways and secondary roads are in general fairly direct from town to town. Between Austin and San Antonio, the federal highway does remain on the prairie, but is forced to detour only slightly from the airline path to avoid the hill country. In detail, the Comal Prairie shows a series of two or three routes that parallel its trend, with short, irregularly spaced roads at approximate right angles. The Hill Country of Comal County and of Kendall County south of the Guadalupe River does not open easy continuous channels in the directions of traffic flow. Here highways and local roads thread their way up convenient segments of stream valleys, and along hill shoulders and divides. Where they are forced to cross the grain of the country in fairly rugged terrain, their routes frequently use pairs of stream valleys which descend opposite sides of the ranges, traversing the sags created by headward erosion. In very rough country the roads take to the valleys almost entirely. In sections of the Hill Country where the drainage pattern is less complex and where it more nearly coincides with the direct routes between towns, as in most of Kerr County and northern Kendall County, the roads follow the valleys to a very great extent. The Guadalupe Valley between Kerrville and Comfort is the prominent local thoroughfare which exemplifies this association. On the Divide, in western Kerr County, the two state highways climb from the Johnson Creek Canyon to follow the water partings between broad draws. East of Comfort, the Guadalupe Valley becomes undesirable for road building because its pronounced entrenched meanders swing across the terraces from cliff to cliff in a fashion which would necessitate either frequent road cuts or river crossings. In two areas, however, sections of the river where the canyon contains little or no terrace land are followed by roads. Upstream from New Braunfels in Comal County and from Hunt in Kerr County scenic drives are constructed. Their many crossings are made by means of low-water cement bridges. The frequency of flash floods makes this inexpensive construction desirable.

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[1] Information from the Kerrville postmaster.

[2] Information from Mr. Holchak, of the Southern Pacific offices at Kerrville.

The wide spaces left between the meshes of the road net are filled by private roads, which in many cases receive some aid from the county.[1] The readily available "caliche,"[2] dug out beside the road, gives an all-weather surface at low cost in comparison with conditions on the Black Prairie.[3] The Prairie farmer, after hauling gravel to his entrance road, finds that it quickly disappears into the deep black clay.

The Quarrying Pattern

One form of land utilization in the Guadalupe Counties for which railroad transportation has continued to be indispensable is quarrying on a large scale. Although the Hill Country contains many small, shallow cuts where crumbly limestone has been removed to surface the nearby roads, and an occasional ranch like that near Sisterdale where flagstone is broken out by crowbars and removed on trailer trucks, the important commercial quarrying is restricted to the two large plants in Comal County. Because of their close relation to the transportation pattern the quarries can be discussed most conveniently at this point.

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[1] Information from the Texas State Highway Department, Austin.

[2] The term "caliche" is used locally to refer to a crumbly white material weathered from limestone.

[3] Information from the Texas State Highway Department, Austin.

The sites selected reflect the two prime requisites for a quarry, an adequate supply of limestone having the desired qualities and easily accessible rail transportation for the bulky, low-priced product.[1] These features occur in conjunction on the Balcones Escarpment itself (Fig. 9). There limestone of sufficient hardness and purity[2] is available under a thin overburden, so that the quarries proper are in the edge of the Hill Country. Ease of quarrying on a hillside location has influenced the selection in each case of a site where a ravine has opened a slot back into the mass of the escarpment. At the outlet of the quarry, on the margin of the Prairie, stand the mill buildings, the railroad spurs, and in the case of Servtex, the dump heaps from the quarry. Since only the Prairie has railroads, the quarries must be nearby to avoid the building of long spur lines.

Although they are similar in site, situation, and available raw materials, the two quarries differ in their products and type of ownership. The older, located at the little town of Dittlinger, about four miles from New Braunfels, produces commercial lime. Started by a local business man, it was purchased by the United States Gypsum Company, the largest producer of gypsum and allied products in the United States.[3] In addition to the advantages listed above, the company was attracted by the excellent supply of water, natural gas for fuel, and low-cost electricity, as well as by the quality of the plant and its convenient location for their purposes.[4] At present the plant is very modern and all operations are mechanized. The overburden is stripped by bulldozers, and the

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[1] Information from Mr. Ogden, of the Servtex Materials Company, New Braunfels.

[2] Ibid.

[3] Moody's Manual of Investments--Industrial Securities--1940 (New York: Moody's Investor's Service, 1940), p. 3124.

[4] The information concerning the U.S. Gypsum plant was obtained from Mr. Burgoyne of the U.S. Gypsum Co., except where other sources are indicated.

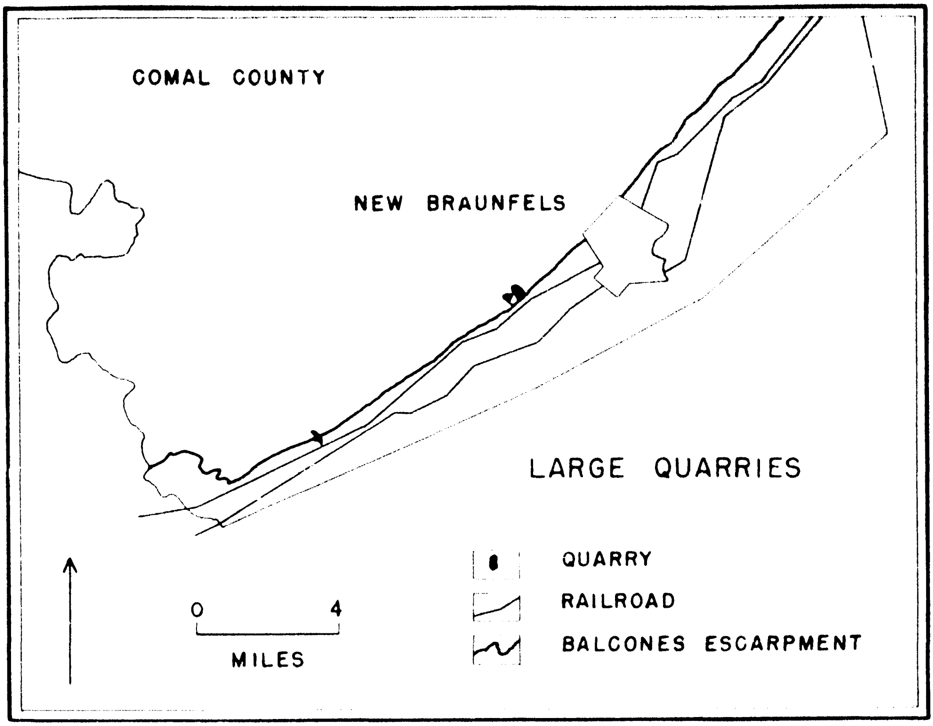

Figure 9

rock is transferred to the kilns by power shovels, dump trucks, and conveyor belts. From the railroad spur beside the plant the lime travels out to Texas and the nearby states. The New Braunfels plant, which is one of the five principal lime plants owned by the company in the United States and Canada,[1] is used to supply a district comprising Texas, Louisiana, Arkansas, Oklahoma, Colorado, Wyoming, Utah, and New Mexico.

The more recently opened Servtex quarry is locally owned. Its site was selected after exploratory borings had been made at likely places along the whole length of the escarpment in Comal County.[2] Careful examination is made necessary by the faulting which has occurred in this area. The Servtex plant shares the advantages in resources and facilities listed above. Although it is nine miles from New Braunfels, and there are a few houses beside the quarry, most of the employees live in New Braunfels. The company runs two buses a day between the town and the quarry, accommodating about one hundred men. The products of Servtex include crushed rock of all sizes, which is used chiefly for road material and railroad ballast, and an asphaltic concrete for road surfacing. Since a great deal of suitable stone is available, and there are seventeen plants operating in Texas,[1] the business is highly competitive. As a result the company may send its stone to any part of Texas in which its bid has won a contract. The products do not go out of the state, however. The company ships by rail for the most part, but makes some use of truck transportation.

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[1] Moody's Manual of Investments, p. 3125.

[2] The information concerning Servtex Materials Company was obtained from Mr. Ogden.

Although the quarries form a very acceptable addition to the livelihood structure of Comal County and to the trade territory of New Braunfels, the mining industry, as represented by these two enterprises, does not rank among the leading employers of the Guadalupe Counties, being outdistanced by all the other classes of employment recognized in the census, with the possible exception of the category transportation, communication, and other utilities.[2]

In the succeeding chapters, the functional patterns developed by the other prominent livelihood activities will be under examination.

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[1] U.S. Bureau of the Census, Sixteenth Census of the United States: 1940. Mineral Industries: 1939, Vol. II (Washington: Government Printing Office, 1944), p. 271.

[2] U.S. Bureau of the Census, County Data Book (Washington: Government Printing Office, 1947), pp. 354, 366. The Bureau of Business Research in its Directory of Texas Manufacturers (Austin: University of Texas, 1947), records the number of employees of the manufacturing plants in terms of seven categories. Both quarries fall into the class of those employing 100-249.

CHAPTER II

THE RANCHING AND FARMING PATTERN

The farming and ranching pattern of the Guadalupe Counties occupies the greater part of their area, but does not support directly a comparable proportion of the people. In Comal and Kerr counties approximately a third of the people live on farms and ranches and get their living from agricultural pursuits.[1] In Kendall County the proportion is higher. About 55 per cent of the population is classed as rural-farm, and the same proportion is engaged in agricultural industries.[2]

Throughout the area the ranching and farming pattern, made up as it is of a mosaic of individual operating units, has certain features in common. The degree of commercialization varies with the aims and circumstances of the operators. Some raise a considerable part of the required food and feed supply, while others depend almost entirely upon the purchase of these items. A diversity of crops and livestock is characteristic, rather than a reliance on one cash product. Such diversity is in accord with the scale of most units. Their relatively small size allows fairly intensive care of stock and crops. Since these small properties are typically one-family enterprises, a variety of products is desirable not only because it reduces labor peaks, but also because it distributes the income through a number of months in the year. Both the variety of products and the scale of operations are consistent with the natural setting.

Dissimilar physical conditions and systems of land use divide the Guadalupe Counties into distinctive areas. The greatest contrast both in the topography and in the system of land use is dramatized by the wall-like Balcones Escarpment, which separates the Black Prairie from the Edwards Plateau (Fig. 10). Within the Edwards Plateau the physical features of the dissected Hill Country

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[1] Computed from the Sixteenth Census of the United States: 1940. Population, Second Series, Texas, pp. 42, 47, 111, 122, 171, 177.

[2] Ibid., pp. 47, 122, 177.

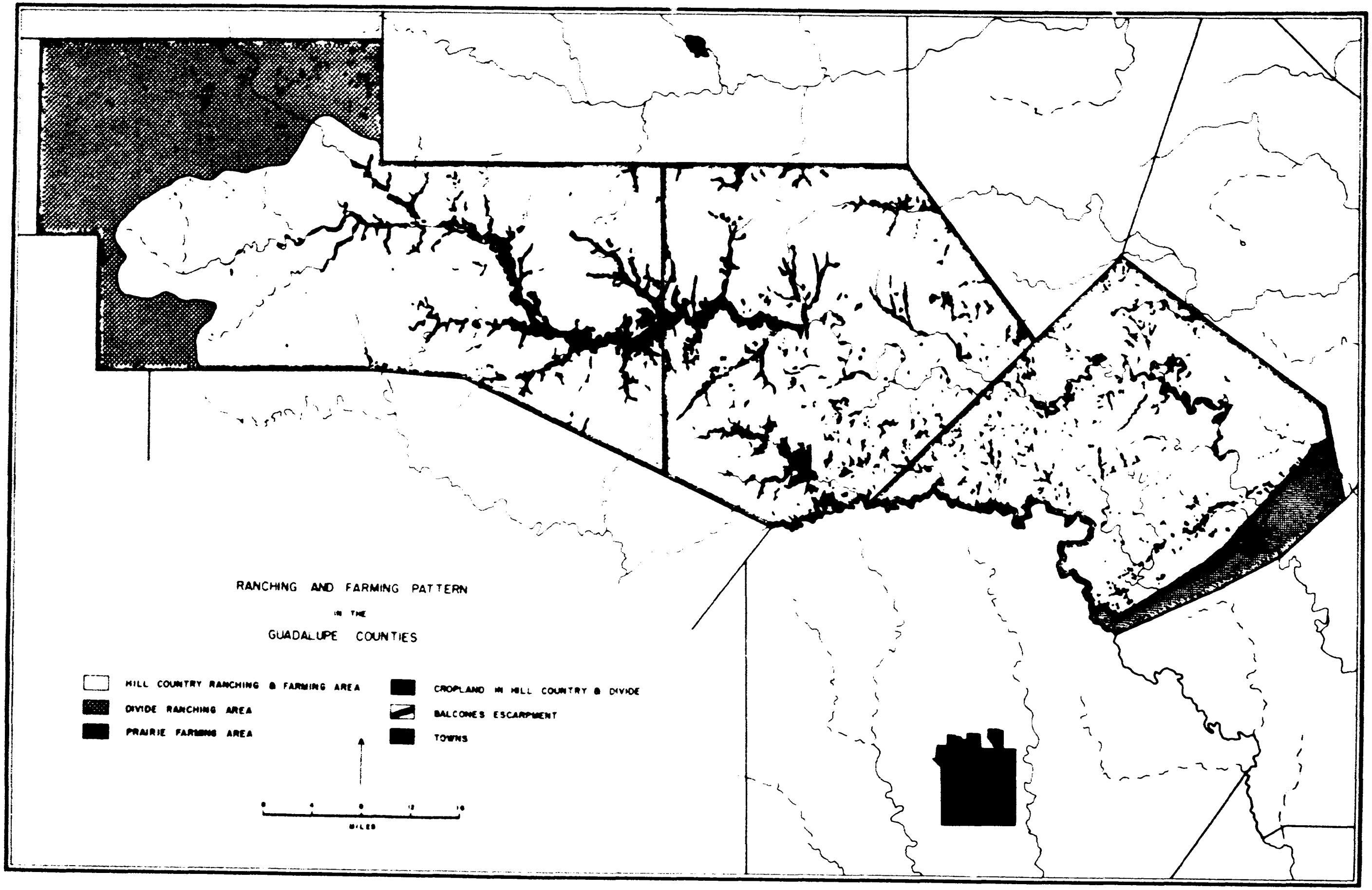
RANCHING AND FARMING PATTERN
IN THE
GUADALUPE COUNTIES
HILL COUNTRY RANCHING & FARMING AREA
DIVIDE RANCHING AREA
PRAIRIE FARMING AREA
CROPLAND IN HILL COUNTRY & DIVIDE
BALCONES ESCARPMENT
TOWNS
0
4
8
12
16
MILES

Figure 10

are notably different from those of the undulating Divide. In ranching systems, however, the distinction between the two areas is much less marked. As would be expected from parts of a single livelihood region, their similarities are greater than their differences. Within the largest of the areas, the Hill Country, a further subdivision of a lower order is recognized on the basis of the presence or absence of cultivated land.

The Ranching and Farming Pattern of the Hill Country

Between the Balcones Escarpment to the east and the undulating Divide to the west, the dissected Hill Country forms a unit that is distinctive both in its natural and its cultural features. Fine textured relief places in close association areas of gently sloping upland, steep, rocky slopes, and smooth valley lands. Since the uplands and slopes generally are suitable only for grazing, while the valley lands are satisfactory for cultivation, the organization of the producing units reflects the mingling of land types in the varying emphasis on stock and crops. The majority of the units contain both range and crop land, but there are also ranches with no cropland. The areas in which farming predominates are interspersed with the areas of ranching to form a very intricate pattern (Fig. 10). However rangeland constitutes by far the greater part of the area, the proportion ranging from 86 per cent to 95 per cent in the minor civil divisions wholly within the Hill Country.[1] A further element of diversity is added by the varying emphasis on specific stocks and crops. Corn dominates in the eastern section, while to the west oats is the chief crop and sheep and goats increase in importance.

Qualities of the Rangeland

The general character of the rangeland is that of hills having short, steep slopes. Although ridges and conical buttes are common, there are also remnants of undulating upland preserved along the crests of several of the large divides. The arrangement of these landscape elements follows the orderly pattern imposed by a dendritic stream system, with the frayed divides surrounding and sending spurs into the broader sections of valley lands. In places the hills come steeply down to the valley flats (Fig. 3), producing an abrupt change in slope, while in other cases the lower flanks of the hills are gentler in inclination. The local relief is of the order of two hundred feet in the less rolling areas, and of six hundred feet in the more rugged sections.

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[1] Computed from unpublished minor civil division data for 1944 furnished by the Bureau of the Census.

Not the slopes alone, but also the thin soils characteristic of the rangelands render them uncultivable. There are considerable areas in which pockets of earth are interspersed with boulders or rock outcrops. In other sections, thin soils littered with stones occur, sometimes alternating with ledges of bedrock. Patches of deeper soils may be found on uplands and on the lower hill slopes (Table 1, Fig. 11). Generally, these soils, developed on limestones, marls, and clays in a subhumid climate, appear to be fairly rich in mineral nutrients, phosphorous being the only supplemental mineral other than salt recommended for stock. From the standpoint of drought resistance the conditions are not so favorable. Thin soils, usually heavy in texture, occurring on steep slopes in an area which frequently experiences torrential rains do not augur well for water storage.

More advantageous is the situation of the range with reference to water supply. Although the majority of the streams in the area are intermittent, some ranges do adjoin watercourses with a permanent flow. In other cases there are dependable springs, often located along stream courses. Well water may be obtained almost anywhere in the Hill Country; however, the majority of the wells are rather deep.[1] Because the most important aquifers are limestone, both the depth to a water bearing zone and the volume of flow are unpredictable.[2] Tanks, though satisfactory in some cases, are adversely affected by the high evaporation rate. Because of the permeable nature of the alluvium in the draws, hillsides with clay soil are preferred locations. Diversion terraces then substitute for natural stream channels in supplying water to the tanks.

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[1] In the Comal Hill Country, for example, out of 287 wells tabulated, the greater number were between two hundred and four hundred feet deep, and only eighty-four were one hundred feet deep or less, according to the report. W. O. George, W. W. Hastings, and S. D. Breeding, "Geology and Ground-Water Resources of Comal County, Texas" (Austin: Texas Board of Water Engineers, 1947), pp. 75-110.

[2] *Ibid.*, pp. 14, 24.

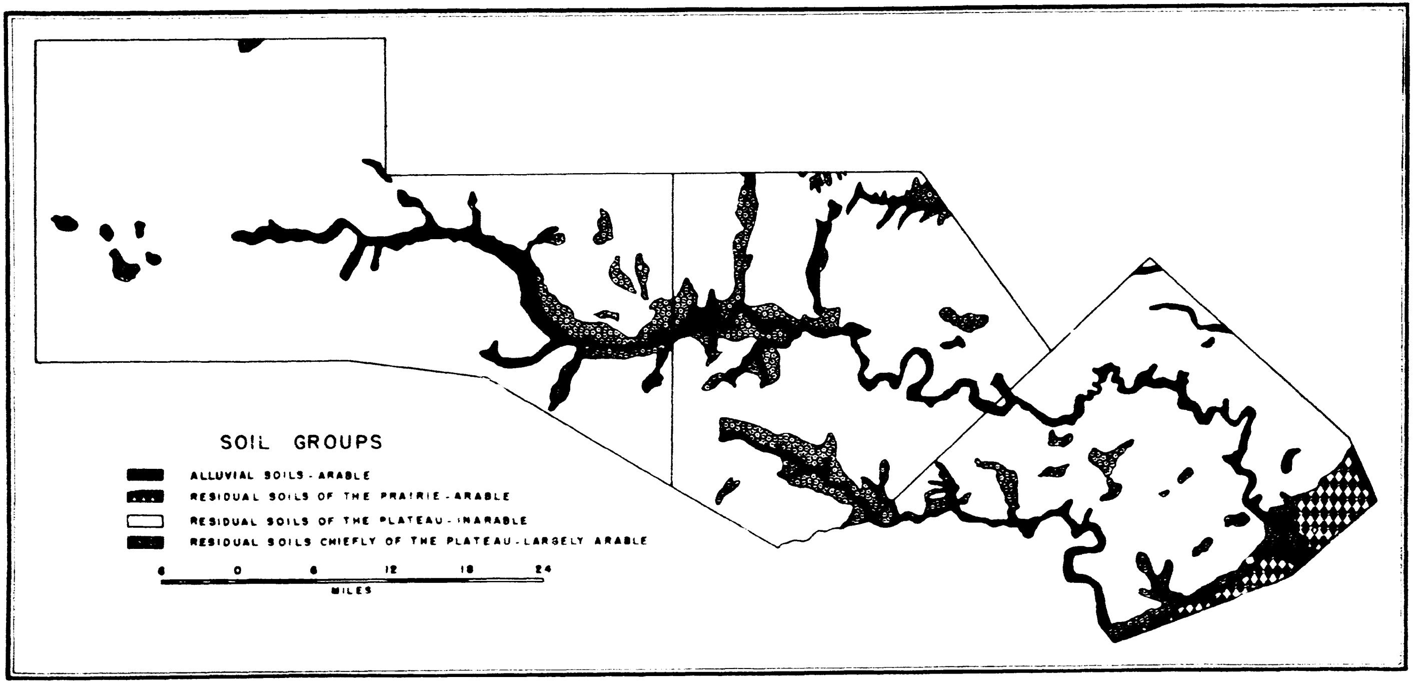
SOIL GROUPS
ALLUVIAL SOILS - ARABLE
RESIDUAL SOILS OF THE PRAIRIE - ARABLE
RESIDUAL SOILS OF THE PLATEAU - INARABLE
RESIDUAL SOILS CHIEFLY OF THE PLATEAU - LARGELY ARABLE
6
0
6
12
18
24
MILES

Figure 11

TABLE 1

SOIL TYPES IN THE GUADALUPE COUNTIES

Soil Type	Topsoil	Subsoil or Substratum	Origin	Utilization
Residual soils, chiefly of the Plateau, largely arable	Dark brown to reddish brown Clay loam to clay, with small chalky particles, or angular limestone fragments and chert cobbles 8-10 inches deep	Redder than topsoil Heavy silty clay to clay, with chalky particles, or angular limestone fragments and chert cobbles Compact Depth 5 inches to 3 or 4 feet	Residual on limestone	Cultivation and some grazing
Residual soils of the Plateau, inarable	Grey, brown, to black Clay loam or clay, some members with large fragments or masses of limestone, some with soil constituting a small percentage of the surface rock material, some locally free of stones A few inches to 10 inches deep	Light brown, reddish brown, or white Clay loam, clay, or limestone Bedrock present as outcrops or at depths from six inches to four feet	Residual on limestone	Grazing
Alluvial soils, arable	Grey, brown, reddish brown, to chocolate brown Fine sandy loam to silty clay loam, some members with limestone gravel 6-15 inches deep	Greyish, yellowish, or reddish brown, or red Loam to compact clay, may include limestone gravel, or may be made up chiefly of limestone gravel	Alluvial and colluvial	Cultivation primarily, grazing on gravelly members

TABLE 1--*Continued*

Soil Type	Topsoil	Subsoil or Substratum	Origin	Utilization
Residual soils of the Prairie, arable	Dark grey to jet black Heavy clay loam or clay, some members with limestone fragments or large amounts of quartz gravel and cobbles Generally high organic content Mellow when cultivated at proper stage, sticky when wet, bakes and cracks 10-12 inches deep	Dark grey to black Clay, some members with gravel Grades into soft chalky material at 3-10 feet	Residual on marl or on terrace sediments of gravel, limestone, and clay in Comal County[b]	Cultivation primarily

[a] Adapted from A. E. Kocher and Party, *Reconnoissance Soil Survey of South Central Texas*, Field Operations of the Bureau of Soils, 1913 (Washington: Government Printing Office, 1916) except where otherwise indicated.

[b] Underlying materials determined by comparing soil survey map (from *ibid.*) with geological map in George, Hastings, and Breeding, *op. cit.*, following p. 142.

The wild vegetation, which plays so critical a role in the functions of the rangeland, has been greatly modified from the expanse of prairie grass found by the original settlers. According to their accounts, timber was restricted to the valley forests, and to scrubby trees on the rough, rocky areas.[1] At present virtually all of the rangeland has the aspect of wooded country, although many of the trees are dwarfed. This development is unfortunate from the standpoint of the grazing industry because woody plants are much less satisfactory forage producers than grass with its associated forbs. The woody species found in this area require considerably more water to produce a given amount of forage than the native grasses do.[2] In addition the pasturage they provide is not suitable for cattle and sheep (Table 2). Thus the

TABLE 2

FEEDING ACTIVITIES OF LIVESTOCK IN PERCENTAGES OF TOTAL TIME SPENT IN FEEDING[a]

	Cattle	Sheep	Goats
Grazing..............	75.90	79.89	38.18
Grass..............	69.01	60.96	30.27
Weeds..............	6.89	18.93	7.19
Browsing.............	8.45	10.08	53.10
Miscellaneous (mast, yucca, etc.).......	13.79	7.42	5.87
Supplemental feeds and minerals.......	1.86	2.61	2.85

[a] Compiled from V. L. Cory, *Activities of Livestock on the Range*, *Texas Agricultural Experiment Station Bulletin* No. 367 (College Station: Agricultural and Mechanical College of Texas, 1927), p. 42.

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[1] Information for Comal County from Mr. Haas, County Treasurer and local historian. Similar accounts quoted in the following unpublished reports prepared by the respective district supervisors on file in the Fort Worth regional office of the Soil Conservation Service: "District Program for Kendall County Soil Conservation District, Texas" (1945), pp. 5, 18; "District Program for Kerr County Soil Conservation District, Texas" (n.d.), pp. 1, 12.

[2] "Range Field Book, Series II" (unpublished material prepared by the Soil Conservation Service, Region IV, Forth Worth, Texas, 1947), no page numbers.

woody plants occupy space at the expense of more desirable varieties. Even though grasses may grow in their shade, these grasses are less nutritious than the ones grown in full sunlight.[1]

The woody plants are not an unmitigated nuisance, nor are they all equally objectionable.[2] A certain amount of shade and shelter for the stock is desirable in view of the summer heat and the winter cold waves characteristic of the climate. The liveoak is preferred for this purpose because in addition to being evergreen and dense-crowned it is a satisfactory browse plant. During the winter shortage of forage and during dry seasons all classes of stock make use of it. Ranchers value their liveoak stand as an emergency feed supply, provided it is not too abundant or too tall for the stock to reach. In contrast, mesquite and the deciduous oaks have only nuisance value. Their leaves are shed at the season of forage shortage, and their crowns are apt to grow too tall. Cedar is the most obnoxious of all the woody plants. It is so unpalatable as to be largely ungrazed, yet over great areas it grows so densely that it permits almost no grass or weeds beneath it. Spanish oaks and liveoaks may form inconspicuous elements in the cedar brake, but 80 per cent of the tree growth is cedar.[3]

Modification of the original plant cover has not been restricted to the spread of woody vegetation, but has extended to the herbaceous plants. The original dominants of the climax prairie were such bunch grasses as little bluestem and sideoats grama, which grew in association with small amounts of short, turf-forming grasses and deep rooted forbs.[4] Because of overgrazing, the best of the grasses and forbs are now of rather rare occurrence, having been replaced by less desirable bunch grasses like the perennial three-awns and hairy grams, by the turf-forming short grasses curly mesquite and buffalo grass, and by various weeds.[1] A comparison of little bluestem with buffalo grass reveals how much has been lost by the change. Although both are highly nutritious when green, little bluestem produces 40 to 50 per cent more forage per acre, and being deeper rooted, is more drought resistant. On the same range, little bluestem plants continued to grow while buffalo grass remained dormant during a recent two-month drought. Curly mesquite is poorer quality than buffalo grass, and perennial three-awn produces seed which are injurious to sheep.

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[1] B. W. Allred, "Southwest Range Plants: Liveoak," Sheep and Goat Raiser, Vol. XXVI, No. 8 (1946), p. 9.

[2] The basis for this evaluation of the woody vegetation is information received from the personnel of the local offices of the Soil Conservation Service and Production and Marketing Administration, and from ranchers of the Hill Country.

[3] H. K. Buechner, "The Range Vegetation of Kerr County, Texas, in Relation to Livestock and White-tailed Deer," The American Midland Naturalist, Vol. XXXI (1944), p. 729.

[4] The basis for this description, except where other sources are indicated, is thirteen of a series of articles by B. W. Allred, Chief, Regional Range Division, Soil Conservation Service, titled "Southwest Range Plants" and appearing in the Sheep and Goat Raiser during 1946 and 1947. See the bibliography for individual volume and page references.

The greater part of the herbaceous plants, both climax forms and present forms, make their growth during the frost-free season. They sprout during February and March, mature seed in late summer, and store food in the root systems in early fall. These are the critical seasons for the welfare of the range, the seasons during which overstocking is most injurious. With frost, the plants become dormant, and although the grasses cure as hay, their protein content is very low. Even the minerals are depleted through leaching as the season progresses.[2] The winter therefore becomes the critical season for the welfare of the stock. The situation is somewhat relieved by the presence of a few cool season grasses such as Texas spear grass and rescue grass. The former, however, is classed with perennial three-awn under the local title "needle grass" and produces harmful seed during April and May.

Use and Products of the Rangeland

The function of the rangeland in the economy of the region is the production of livestock on low-cost forage.[3] In the Hill Country of the Guadalupe Counties the range in its present stage of modification lends itself to the grazing of three species of livestock, cattle, sheep, and goats (Fig. 5). Although there is a variation in the proportions, reflecting individual preferences and local differences in range qualities, all three types of stock are found together on most of the ranges.

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[1] Buechner, op. cit., pp. 707, 742.

[2] Information from Mr. V. L. Cory, who was for many years range botanist for the agricultural experiment station in the Edwards Plateau.

[3] In an interview, Mr. Allred emphasized the fact that the range should be a place where livestock are produced on low cost roughage rather than on high priced commercial feed.

In the livestock enterprise of the Hill Country, beef cattle hold a prominent place. The majority are Herefords, which have the reputation of being good rustlers. Among the mature cattle, breeding stock predominates because the Hill Country is primarily a calf-producing region. The winters are mild enough to permit the range calves arriving in December and January to thrive (Table 3). They are generally sold at weaning time in the late summer and fall. Cattle make heaviest demands on the grass vegetation of the range, though they consume some weeds and a little browse (Table 2). According to a study made in a neighboring county, cattle are not as well adapted to the rough, steep slopes as to the smoother ranges.[1]

Sheep, though present in all parts of the Guadalupe Hill Country, become somewhat more numerous in the western part. They are predominantly fine wool sheep of the Delaine and Rambouillet breeds. Within the last few years, however, in Kendall and Kerr counties, sires of mutton and combination breeds, such as Suffolk and Corriedale, have been introduced by some of the ranchers. The cross produces a larger and better quality lamb, while the ewe flock still yields a fine wool clip. Because of the mild winters (Table 3), early lambs can be raised. Arriving in December, they are ready for sale in April or May. However, losses may be incurred if severe northers strike. In the last twenty years there have been eight spells of severe weather during which the maximum temperatures for several days in succession dipped into the thirties and light precipitation occurred.[2] Although sheep and lambs can stand a considerable amount of dry cold, even mature sheep may succumb to low temperatures accompanied by rain. The

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[1] B. Youngblood and A. B. Cox, An Economic Study of a Typical Ranching Area on the Edwards Plateau of Texas, Texas Agricultural Experiment Station, Bulletin No. 297 (College Station: Agricultural and Mechanical College of Texas, 1922), p. 179.

[2] Compiled from the daily temperature and precipitation for Kerrville given in U.S. Weather Bureau, Climatological Data for the United States by Sections, Vols. XV-XXXIV, Texas (Washington: Government Printing Office, 1928-1947).

TABLE 3

AVERAGE MONTHLY MAXIMUM AND MINIMUM TEMPERATURES IN THE GUADALUPE COUNTIES[a]

	Average Maximum Temperature (Degrees Fahrenheit)			Average Minimum Temperature (Degrees Fahrenheit)		
	Kerrville	Boerne	New Braunfels	Kerrville	Boerne	New Braunfels
Jan.	62	62	62	32	38	41
Feb.	65	67	66	37	40	44
Mar.	72	72	73	46	48	51
Apr.	78	76	79	52	54	58
May	83	82	84	60	61	65
June	90	90	91	66	67	71
July	93	93	94	68	68	73
Aug.	94	95	94	68	68	73
Sept.	89	88	89	63	64	69
Oct.	80	79	80	52	54	59
Nov.	69	69	70	43	46	50
Dec.	61	61	62	36	38	42

[a] Compiled and rounded from Climatic Summary of the United States, sec. 33, pp. 33-32, 33-33.

condition of the sheep and the care they receive have much to do with the losses incurred during these spells.[1] Many ranchers prefer to delay lambing until March although this program also means a later selling date. With the marketing of both wool and lambs, sheep give the rancher products for sale two or three times during the year, in contrast to cattle, which yield a return on the investment only once a year. Sheep, when present in the proper proportion, also perform a valuable service in controlling the growth of weeds in the pastures. If their numbers are excessive, however, they will compete seriously with cattle, because, in spite of the quantity of weeds they consume, about 60 per cent of their diet consists of grass (Table 2). Like cattle they do relatively little browsing by choice.

Angora goats differ from sheep in yielding products with a more restricted market. Mohair is used in relatively few types of fabrics,[1] and chevon has a very limited sale in comparison with mutton.[2] Unlike sheep, Angora goats are one-purpose livestock, kept primarily for mohair, with no expectation that rising meat prices might at times make the kids more valuable than the hair. Nevertheless, mohair generally brings a higher price than wool.[3] Furthermore, goats perform a service in maintaining a balance in grazing pressure. Being primarily browsing animals, they aid in the control of brush, which is very little used by either cattle or sheep. Since they spend only 30 per cent of their feeding time on grass (Table 2), they compete little with cattle, and in consuming the brush they convert into marketable form much forage which would otherwise contribute to the ranch income only in its support of the deer. Goats take more readily to rough country than cattle or even sheep.[4] However, their venturesome habits, together with the fact that they are more susceptible to cold, causes them to require much more care than sheep.

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[1] Information from ranchers in the Hill Country.

In the use of the rangeland two of the most pressing problems, proper stocking and brush control, are interrelated. Overgrazing is believed to have been responsible at least in part for the invasion of woody vegetation;[5] furthermore, when brush has been cleared from a range, its replacement by desirable plants may be prevented by overstocking.

Qualities of the Cropland

The greater part of the croplands are river terraces found in the larger stream valleys (Fig. 10). Where the main streams are joined by tributaries, some of the greatest expanses of cultivated land occur; where spurs extend from the hills, the croplands are constricted. The terrace surfaces are smooth and slopes are low except near the borders where they adjoin the streams and the hills. Because the streams are entrenched, the terrace lands are well drained.

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[1] Information from Mr. Garrett, Schreiner Wool and Mohair Commission, Kerrville.

[2] Information from Mr. Carpenter, Ranch Experiment Station, Edwards and Sutton counties.

[3] U.S. Department of Agriculture, Agricultural Statistics: 1946 (Washington: Government Printing Office, 1946), pp. 354, 357.

[4] Youngblood and Cox, op. cit., p. 179.

[5] W. L. Bray, The Timber of the Edwards Plateau of Texas, U.S. Bureau of Forestry, Bulletin No. 49 (Washington: Government Printing Office, 1904), pp. 14-15.

The soils are of alluvial origin (Table 1, Fig. 11). Derived from the local limestones, marls, and clays, they are generally rather fine textured and slowly permeable. Their chief mineral deficiencies are phosphorous and nitrogen, but in the opinion of one of the experts the need for organic material is more serious. Being deep soils, they have much capacity for water storage.

Not all of the tilled fields are on terrace land, however. On divides and hill slopes deeper soils occur in patches. The most notable display is found in an area on either side of the Comal-Kendall county line (Fig. 10). Generally the upland fields resemble those of the valleys in having rather heavy soils of similar mineral composition, but contrast in the depth to bedrock (Table 1, Fig. 11). Not infrequently they are littered with small stones. Though many are low in slope, there are some fields with 8 degree slopes in cultivation.[1]

Certain problems arise from the physical conditions of the croplands. The combination of steep slopes characteristic of the hill country and frequent heavy rains[2] causes much drainage across the cultivated fields. A common sight in this area is the diversion terrace either along the upslope margin of the field itself or in the pasture above it. Although a system of terraces can protect fields to a considerable extent, it may give way under occasional excessive rains such as the 6.42 inches which fell in twenty-four hours at Kerrville in 1936. When soil and crops are relatively well protected from washing, there still remains the problem of water loss. A comparison of the potential evapo-

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[1] Information from the Soil Conservation Service office in Boerne.

[2] During the twenty years, 1928-1947, forty-seven rains of two inches or more in twenty-four hours occurred at Kerrville. Generally a single year had several rains of this intensity. Only four years of the twenty lacked such rains; only two years had a single downpour of this intensity, while the month of September, 1936, had rains of 6.42 inches, 5.95 inches, and 4.58 inches on different dates. These data were compiled from *Climatological Data for the United States by Sections*, Vols. XV-XXXIV, *Texas* (1928-1947).

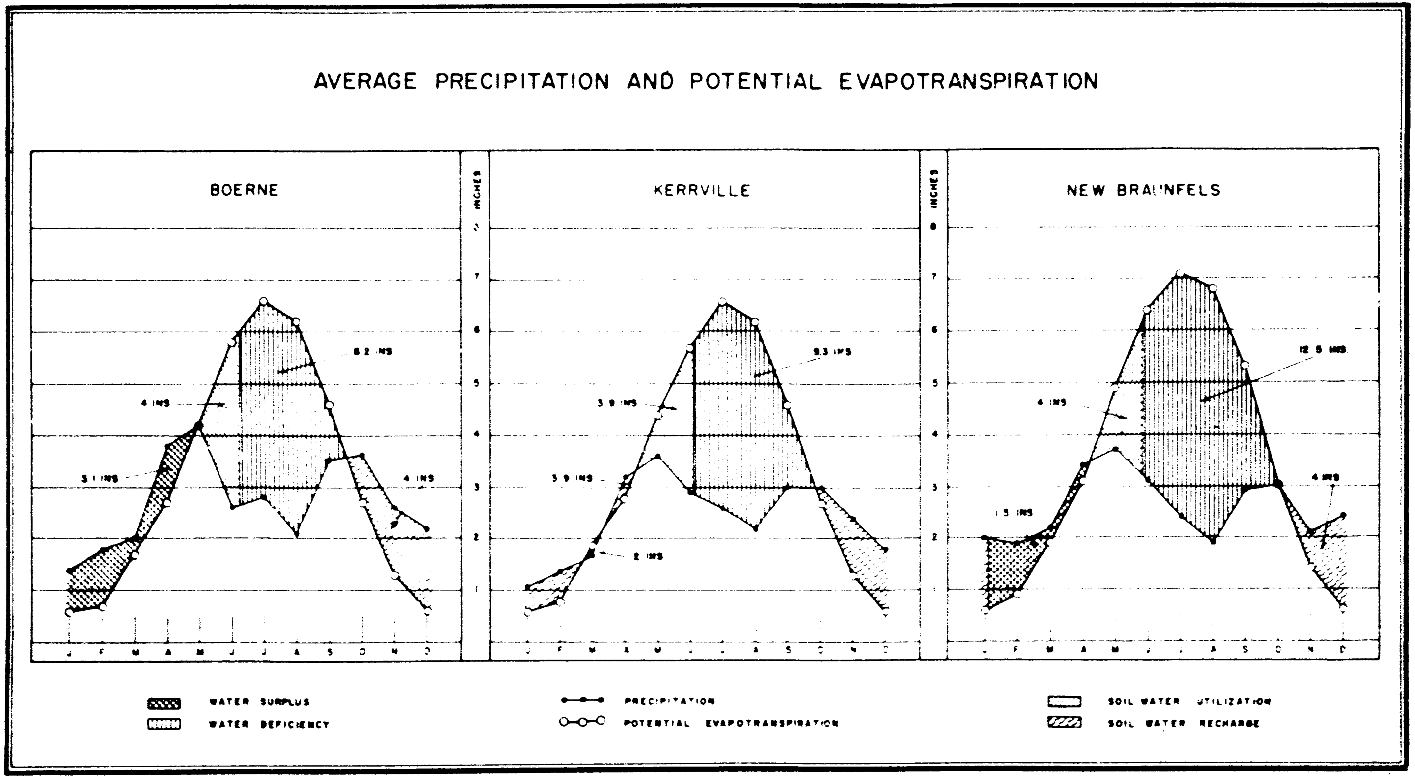
AVERAGE PRECIPITATION AND POTENTIAL EVAPOTRANSPIRATION
BOERNE
KERRVILLE
NEW BRAUNFELS
INCHES
1
2
3
4
5
6
7
8
J
F
M
A
M
J
J
A
S
O
N
D
3.1 INS
4 INS
8.2 INS
4 INS
3.9 INS
3.9 INS
2 INS
9.3 INS
1.5 INS
4 INS
12.5 INS
4 INS
WATER SURPLUS
WATER DEFICIENCY
PRECIPITATION
POTENTIAL EVAPOTRANSPIRATION
SOIL WATER UTILIZATION
SOIL WATER RECHARGE

Figure 12

transpiration[1] with the average precipitation reveals a deficit of moisture that ranges from 3.8 inches to 4.1 inches during July and August (Fig. 12). Since heavy showers are fairly frequent, the deficiency in some years may be greater than the formula indicates because of the resulting loss through runoff of a part of the precipitation.[2] Variability in rainfall must also be reckoned with. During a thirty-five-year period approximately one-third of the months had half or less than half their normal precipitation (Table 4, Kerrville and Boerne). Months with twice the average

TABLE 4

NUMBER OF MONTHS WITH PRECIPITATION HALF OR LESS THAN HALF THE AVERAGE, AND TWICE OR MORE THAN TWICE THE AVERAGE DURING THE THIRTY-FIVE YEARS 1896 TO 1930[a]

	Number of Months with Half or Less Than the Average			Number of Months with Twice or More Than the Average		
	Kerrville	Boerne	New Braunfels	Kerrville	Boerne	New Braunfels
Jan.	11	15	14	8	4	3
Feb.	14	13	14	2	3	4
Mar.	11	11	10	5	2	6
Apr.	11	5	10	2	5	5
May	8	12	5	4	2	1
June	12	14	13	3	5	4
July	13	12	15	3	8	5
Aug.	17	17	17	4	5	2
Sept.	11	10	14	4	3	2
Oct.	10	10	7	4	6	4
Nov.	14	11	11	4	5	2
Dec.	11	8	8	4	5	2

[a] Computed from *Climatic Summary of the United States*, sec. 33, pp. 33-11, 33-21, 33-24.

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[1] The potential evapotranspiration is the amount of water that would transpire and evaporate if it were available. C. E. Thornthwaite, "An Approach Toward a Rational Classification of Climate," *Geographical Review*, Vol. XXXVIII (1948), p. 56.

[2] A specific instance is given in G. T. Ratliffe and I. M. Atkins, *Crop Rotation and Tillage Experiments at the San Antonio Field Station*, *U.S. Department of Agriculture, Circular No. 193* (Washington: Government Printing Office, 1931), p. 23.

amount constitute a much lower percentage, but occur during most years (Table 4, Kerrville and Boerne), and occasionally a month will have five or six times its ordinary amount. Thus excess as well as deficient moisture is a problem in the area. The annual precipitation, however, does not show such wide swings from the mean, and water storage in the soil reduces the effect of the short-term variations.

A product of the periodic torrential rains and the steep slopes on which they fall is the flash flood, which is of frequent occurrence. Many of these affect relatively small areas, but several of considerable magnitude have occurred since the region was settled. In appraising the amount of damage done by flood in the Hill Country, Kerr County may be used as an example. The army engineers estimated that 3,455 acres of cropland[1] (out of about 35,030 acres in the county[2]) and 5,212 acres of rangeland[3] (out of about 689,731 acres[4]) were flooded in 1932, one of the worst floods of record. The damage to growing crops and grazing land was placed at $58,980, the total damage for the county being $1,051,945. In 1930, the nearest census year, the total value of crops and livestock in Kerr County was $2,848,118.[5] It is apparent from these figures that, while flood constitutes a serious problem, it also is a highly localized menace, affecting only a small portion of the county's agricultural land. However, the valley cropland is productive out of proportion to its area, and many valuable installations are found in association with it. The low percentage of the cropland that was flooded, despite the fact that most of the arable land lies on narrow terraces, results from the high banks of the entrenched Guadalupe River.

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[1] "District Program for Kerr County Soil Conservation District, Texas," p. 8.

[2] U.S. Bureau of the Census, Fifteenth Census of the United States: 1930. Agriculture, Vol. II, Part 2 (Washington: Government Printing Office, 1932), p. 1372.

[3] "District Program for Kerr County Soil Conservation District, Texas," p. 8.

[4] Fifteenth Census of the United States: 1930. Agriculture, Vol. II, Part 2, p. 1372.

[5] Ibid., p. 1568.

Use and Products of the Cropland

In the economy of the Hill Country, the cultivated lands fill the dual role of providing crops and pasturage. They contrast with the range in their greater productivity, and, as a consequence, are more important than their area would indicate. They dovetail with the range in ranch and farm operations, for the temporary pasture they afford can be used to rest the range or to allow the storage of winter feed in the form of cured grass. The grain and fodder crops which occupy the greater part of the croplands may be fed to the livestock or sold.

Corn, which is the leading crop in the Comal Hill Country and takes second or third place in acreage in the different sections of Kendall and Kerr counties, has a relatively low yield (Table 5). The reasons given are insufficient moisture, soil depletion, and heavy damage inflicted by deer. Undoubtedly the importance of each of these factors varies from year to year and from place to place. Planted early, the corn crop is "made" by the June harvest rains, before the late summer drought sets in.

Oats leads in acreage throughout the Hill Country of Kendall and Kerr counties. It is important not only as a grain but also for the pasturage it provides during the winter season. For a satisfactory growth of the cross-bred mutton lambs, the ewes require succulent forage with high protein content. Small grain plants supply this need at a season when most of the native grasses are dormant. Not only is oats acceptable in the farming system, it also appears suited to the physical conditions. Its yield is a little higher than the average for other grains (Table 5). However there are difficulties with the harvest, caused by the crop's tendency to lodge and by the prevalence of rain and dew in the harvest season (Fig. 12).

Wheat occupies little acreage except in the Guadalupe Valley near Comfort. Although the varieties formerly grown did not give a satisfactory yield, the new Austin wheat, a rust-resistant type, seems to have promise. Like the other small grains, winter wheat provides valuable winter grazing, but suffers from a wet harvest season.

Both grain and forage varieties of sorghum are popular in the Hill Country. According to a local rancher, the former in some years gives a better yield than corn. The latter makes a satisfactory summer pasture. Because of the rather dry summers, the drought resistant qualities of sorghum are important.

TABLE 5

YIELDS OF SELECTED CROPS IN THE GUADALUPE COUNTIES FOR THE CENSUS YEARS FROM 1899 TO 1944[a]

(Bushels per Acre)

	Corn	Oats	Wheat	Sorghum
Comal County				
1944	13	19	8	16
1939	6	18	10	7
1934	11	21	10	14
1929	19	22	13	16
1924	19	29	15	11
1919	29	41	16	25
1909	9	17	6	7
1899	20	12	8	..
Kendall County				
1944	15	22	11	16
1939	11	23	11	14
1934	8	24	9	10
1929	19	24	14	17
1924	22	34	16	15
1919	30	45	17	23
1909	4	8	6	9
1899	22	18	8	40
Kerr County				
1944	20	28	13	15
1939	14	18	11	22
1934	5	25	9	8
1929	16	22	12	17
1924	20	33	16	9
1919	30	48	18	16
1909	5	8	6	14
1899	20	14	6	..

[a] Computed from data published by the U.S. Bureau of the Census for the respective census years.

An element of strength is added to the economy of the region by the cultivation of both summer and winter crops, since unfavorable conditions in one season may be offset by better conditions in the other.[1]

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[1] Ratliffe and Atkins, op. cit., p. 16.

Functional Patterns of Hill Country Ranching and Farming

The functional patterns of ranching and farming in the Hill Country reflect the systems devised for the productive use of an area which has small tracts of arable land distributed irregularly through a much larger expanse of range. Using the crop and livestock combinations with which they were familiar,and adding new products from time to time, the ranchers and farmers evolved a type of occupance that gives an aspect of similarity throughout the region. The recurrence of the same feed crops and breeds of stock, together with the characteristic types of fencing and buildings, framed in a repeating pattern of natural features constitutes the visible evidence of the region's unity. Diversity takes the form of variations in the proportions of crop and range land, in the relative importance of specific types of crops and stock, in qualities of the land and vegetation, and in such items as property sizes which are not visible in the landscape. Individual preference, familiarity with the various products, current economic conditions, and local differences in the land are all factors which are involved in molding the functioning units which, taken together, form the ranching and farming pattern.

The gross functional pattern consists of the distribution of the two dominant types, the ranches and the farms. Since recent property maps are not available, the distribution of crop and range land is substituted to give the approximate distribution of these agricultural types (Fig. 10). Although there are fairly large blocks of unbroken range along the upper Guadalupe River and in the divide stretching across northern Kendall County, and correspondingly large expanses of arable land in the middle Guadalupe Valley and around Boerne, the dominant impression produced by the pattern is that of an interfingering of the two types. The mingling is most pronounced in the area of upland fields on either side of the Comal-Kendall county line. In the light of this distribution, the high percentage of operating units having some cropland is not surprising. In precincts wholly within the Hill Country, this proportion ranges from 69 per cent to 94 per cent.[1]

The minor functional patterns, comprising the individual ranches and farms, are indicated but not delimited in the landscape by the presence of headquarters buildings and fence lines. An examination of sample ranches and farms reveals the nature of those livelihood activities which have given rise to the visible forms and patterns of the countryside.

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[1] Computed from unpublished minor civil division figures for 1944 supplied by the Bureau of the Census.

A Guadalupe Valley farm

One of the most extensive areas of cultivated land in the Guadalupe Hill Country stretches along the river in the vicinity of Center Point and Comfort (Fig. 10). Framed in rough hills, it carries the chief route from Kerrville to the regional capital, San Antonio.

A mile west of Center Point on the valley thoroughfare lies a farm which has existed as an operating unit since 1890. Its high degree of accessibility is evidenced by the array of transportation lines which cross it. In size and shape it is representative of the others in the vicinity.[1] Originally one section of land measuring one-half mile by two miles, it has been altered only by the sale of the two south corners for residential use (Fig. 16). In accordance with the original surveys of this locality, the property is elongated in a north-south direction, and runs to the Guadalupe River but not across it.

The physical plant.--The survey pattern has produced a farm with a slice of cropland on the river terrace backed by a long narrow strip of hilly land in permanent pasture. Along the line where the two join stands the homestead, equally accessible to fields or pastures, but set back a little distance from the present highway, and even farther from the river road which formerly was its outlet. This is a type of site frequently chosen because it permits one well to supply both domestic and stock water. A further advantage in this instance is the fact that the buildings are sheltered from the cold north winds of winter by the wooded hills, though open to the southerly summer winds.

The plan of the cropland reflects physical limitations at the northern and southern extremities, but transportation lines establish nearly all the field divisions. In keeping with the

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[1] The information on which this study is based was derived from the owner of the ranch, from the local Soil Conservation Service office, and from observation in the field.

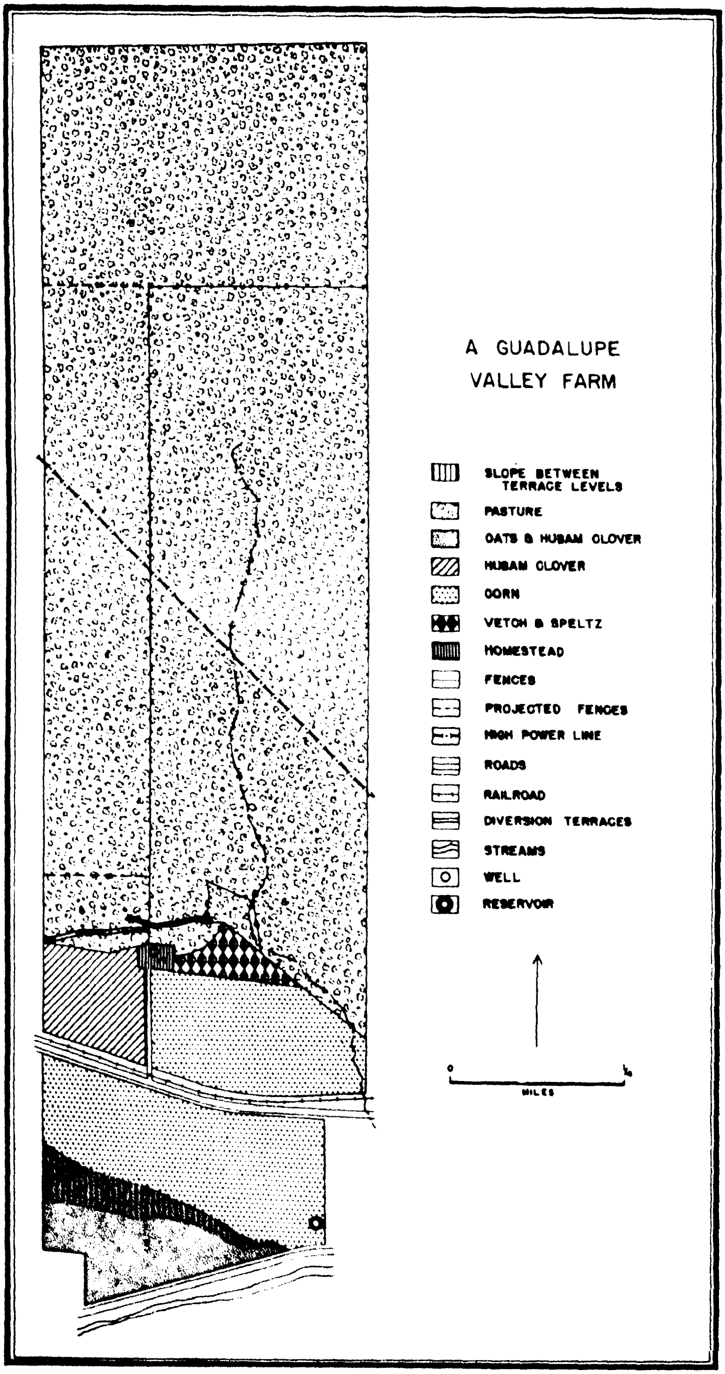
A GUADALUPE VALLEY FARM
SLOPE BETWEEN TERRACE LEVELS
PASTURE
OATS & HUBAM CLOVER
HUBAM CLOVER
CORN
VETCH & SPELTZ
HOMESTEAD
FENCES
PROJECTED FENCES
HIGH POWER LINE
ROADS
RAILROAD
DIVERSION TERRACES
STREAMS
WELL
RESERVOIR
0
¼
MILES

Figure 13

areal predominance of rangeland and the practice of grazing the crops is the maintenance of tight fencing along both the outer boundaries and the field divisions.

The physical constitution of the land has features both favorable and unfavorable to its cultivation. The alluvial soils of the terrace are deep, giving ample space for water storage. However, they are also fine textured and slowly permeable. The slope of a portion of the terrace (the northern part of the field south of the railroad) is so low as to require no protection against erosion, but two sections, that at the border of the pasture and that where the upper terrace descends to the lower level, are steep enough to need special care (Fig. 13). Terraces have been constructed on all the fields except the level section referred to above. Since the greater part of the runoff which threatens the fields originates on the range, further protection is afforded by two diversion terraces in the pastures. A drainage ditch on the west side and a creek on the east carry off surplus water from both the pastures and the fields.

Although the range is to a certain degree a topographic unit, its fence lines correspond to a rectangular survey rather than to the outlines of the drainage system (Fig. 12). For operating convenience, it is divided into two pastures of nearly equal size. The land is hilly, with interspersed areas of thin soil, limestone ledges, and crumbly caliche. It rises from the draw in low terraces to the west and in smooth curves to the east. Northward, slopes steepen, reaching a climax in two conical hills which occupy most of the back pasture.

The range as a whole has the aspect of an open woodland with small liveoak and deciduous oak trees shading a short grass and bunch grass ground cover. Not only is there no brush in the pasture, but even the trees have been trimmed clean as high as a goat can reach. The open flats of the draw have the appearance of a closely clipped lawn, but the most severe overgrazing is immediately adjacent to the homestead, where the stock come daily for water. The exception is the back part of the west pasture, which is in fair condition. The latter pasture was deferred last year during the whole of the growing and seeding seasons of the range grasses.

A pasture improvement program has been initiated which attacks the problem from several angles. The long-lived oak trees are being cut as rapidly as practicable. Although the wood is sold, none of the brush is burned. Part is piled into the shallow gullies in the draw, and the remainder is left on the ground to shelter the grass from grazing and allow it to mature seed. Deferred grazing is made possible by the availability of the cropland for pasture, the acreage being sufficient to accommodate all of the present stock at the accepted rate of one animal unit to four acres.[1] The planned fencing-off of a third pasture in the back part of the west pasture (Fig. 13) will secure a better use of the rougher land which is farther from water, and relieve the pressure on the range near the homestead. In addition it will permit the rotation of stock among the pastures. Before the plan can be realized, however, a tank for stock water must be constructed.

Several other improvements in the physical plant of the farm are projected. A small pasture, or "trap," will be fenced off to facilitate handling the stock. The homestead will be set back a little so that the barn can be built against a hillside to eliminate the lifting of loads into its loft. The storage space provided by the barns and sheds, at present inadequate, will be considerably expanded.

Livestock.--In the present stocking of the farm the emphasis is on sheep because the range vegetation is not satisfactory for cattle. The presence of 150 Delaine ewes and two registered Suffolk rams reflects the shift from fine wool to early lamb production as the primary function of the flock. The Delaine is a small, hardy, highly specialized fine wool sheep. At the age of four months its lamb will weigh about forty-five pounds, in contrast to the cross-bred Suffolk lamb, which averages seventy to seventy-five pounds provided the ewe is kept on good pasturage. None of the Suffolk lambs are kept as replacements because they are less hardy and yield less desirable wool than the Delaines. No Delaine rams are included in the flock because the rancher finds it more profitable to devote his acreage to mutton lambs and buy the ewes at breeding age. On the other hand, old ewes are not sold as long as they can support a lamb, since the lamb currently brings four times as much as a culled ewe.

Under the system of loose herding in fenced pastures which is typical of the Edwards Plateau, sheep can be managed so as to require very little of the time and attention of the owner. The Guadalupe Valley farm is a case in point. The shearing is done twice a year by special "outfits" which provide their own machines (Fig. 14). Because of the small size of the flock the job is completed in a day. Mineral supplements and medicines are supplied by self-feeding troughs. Since both the minerals and the water are at the homestead, the flock can be watched without being rounded up, and only when sheep-killing dogs are about do frequent trips to the pasture become necessary. For several decades no other predatory animals have given trouble.

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[1] The Soil Conservation Service estimates that in this region four acres of cropland can support one animal unit yearlong.

A herd of six cows with their calves is on the range at present. Although no milk is sold, the cows are Jerseys. They are bred with Angus to produce a good beef-type calf, which should thrive on the abundant milk supply. The calves are sold at six to eight months of age (Fig. 14). Cattle are the only stock that are fed on this farm. During the winter they receive hay and concentrates. However the farmer plans to improve his pasture and adjust the stocking rate so that no feeding will be necessary when the range has reached the condition toward which he is working.

At present there are no goats on the range because there is no suitable browse within their reach.

In its stocking the farm is in a state of transition. Formerly it carried forty grown cattle and five hundred sheep and goats. The present small numbers are an intermediate stage in a plan which will ultimately place the emphasis on cattle, with enough sheep and goats to keep the range in good condition. When the plan has matured, the farm will carry about forty cattle, one hundred sheep and fifty goats.

Crops.--The rotation initiated this year puts the following crops on the fields in succession: Hubam clover, corn, wheat, and oats (see Fig. 15 for the crop seasons). Hubam, a winter annual, performs the dual functions of providing green pasturage and improving the soil. It supplies both nitrogen and humus, producing a rank growth to be turned under. Superphosphate is applied with the clover. Because the dry summers often cause peas to be unsatisfactory when planted after the small grain harvest, the winter clover is preferred, even though it requires a full year in the rotation. Corn, reputed to draw most heavily on the soil fertility, follows Hubam. Because wheat can be planted later than oats, it succeeds corn. Wheat yields on this farm have been approximately doubled with the introduction of Austin wheat, a rust-resistant

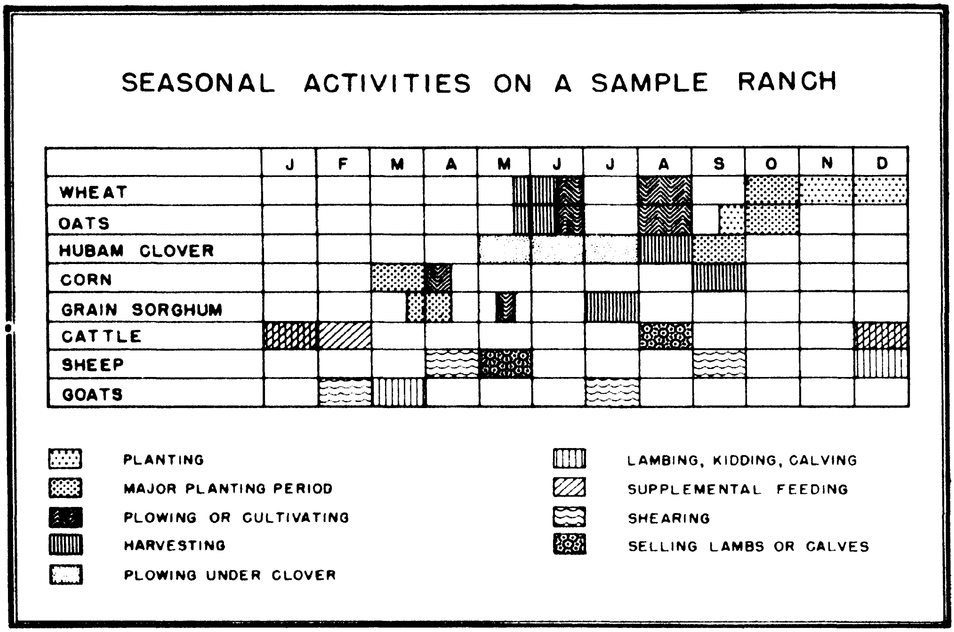

Figure 14

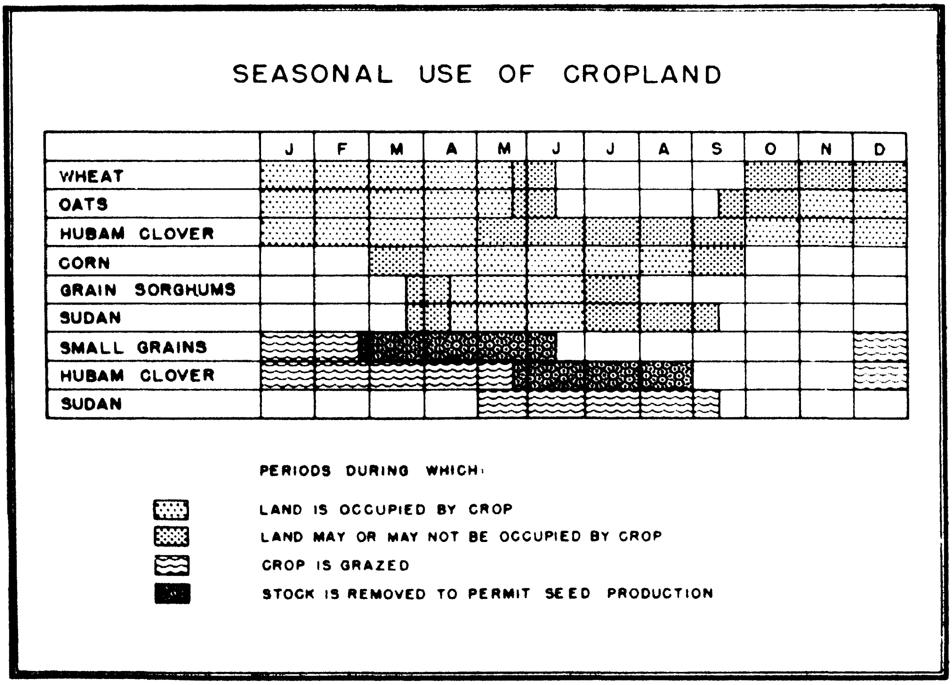

Figure 15

strain. Harvested in June, it leaves ample time for the preparation of the land and the planting of an early oat crop to provide winter grazing. This rotation is of course subject to variation with the vicissitudes of weather and prices.

A number of other crops may substitute in the rotation or occupy a minor part of the acreage. Vetch is being grown for seed this year. Because of its stiff straw, speltz[1] is sown in the same field to support the vining vetch. Alfalfa is given little room because dry summers mean relatively low yields, and the crop is considered more permanent than Hubam. Sorghum is substituted for corn in some years.

From the charts of seasonal activities (Figs. 14 and 15) it is clear that this is not an area in which the planting of a crop follows close upon the harvest of another. In a given field, one crop a year is the rule; consequently, the land is idle for considerable periods. Between crops the farmer prefers to have at least three months in which to break the land, get a rain on it, and allow it to lie for a while in a mellow condition. Experiment convinced him that it is not profitable to hurry the land. This decision appears to be in accord with the limited moisture supply (Fig. 12).

The role of the fields in the farm economy includes the production both of crops for sale and of green pasturage for early lambs. The importance of the latter function is illustrated by the farmer's decision to finish out the lambs this season at the expense of the oat crop. A high price for the lambs is assured, but a continuation of the dry conditions of 1947 would materially reduce the crop yield.

An additional product of the fields and pastures is the annual deer harvest. White-tailed deer are quite abundant in this vicinity according to the local people. The hunting rights on the Guadalupe farm are leased at the legally established rate of twenty-five cents an acre, or approximately $160. This is not clear profit, however. The deer exact a heavy toll from the crops. In winter when the grass is dry, they show a special preference for legumes, while during the summer drought the succulent row crops suffer. In the pastures also they compete for forage with the domestic stock. Nevertheless, the five deer killed this season, bringing a return of around $32 each, rank as valuable livestock.

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[1] The local term "speltz" is retained since the well informed ranchers and farmers say there is some uncertainty whether the crop is spelt or emmer.

Marketing and market centers.--Because of the extent to which the activities of the farm are directed toward commercial production, the harvest of its fields and pastures for the most part flows into the regional and interregional trade channels, rather than being retained for home use. Diversification in both stock and crops distributes the flow over a number of months, decreasing labor peaks and multiplying the periods during the year when there are monetary returns (Fig. 14).

At present, the crops are usually picked up in the field by trailer trucks and pass directly onto the highway which bisects the fields. This is caused in part by the inadequacy of the existing storage facilities for housing the entire crop, and in part by the current market conditions. Since the prices of oats and cotton seed cake are approximately the same, and the cake contains four times the protein content of oats, it is obviously more economical to sell the grain and buy the cake needed for feed.

There is no single market for the crops, some being used within the region while others go beyond its limits. Since the area west of Center Point has less cropland, it forms a good market for feed crops, especially for oats. Some grain is taken by local feed stores, but these as a rule prefer to buy small lots at intervals, and the inadequate storage facilities common to the ranches and farms of this area makes such operations inconvenient. Mills at New Braunfels and San Antonio, standing at the margin of the hill country, are also important buyers.

The livestock are marketed at San Antonio, the early lambs from the oat and legume pastures being ready for slaughter. As in the case of the grain, they travel by highway in the versatile trailer trucks, which are doubledecked for the transportation of sheep.

Wool, like the stock, goes beyond the region, but its sale is handled locally. It is trucked to Center Point, the nearest shipping point.

Because the farm operations are oriented almost exclusively toward commercial production, the needs of the farm are supplied largely from commercial channels. Items produced for home use are restricted to milk, a few chickens, and wood for fuel, a by-product of pasture clearing. It is consistent with the rapid and flexible transportation available, that the farm shopping should be shared by a number of trading places. Most of the groceries come from the nearest town, Center Point. Kerrville is the main center for the rest of the shopping, especially for dry goods; however, hardware and machinery are more often bought at Comfort and Fredericksburg, and fence wire is purchased at Ingram.

A farm in transition.--Although ranching and farming seem to be characterized by both short range fluctuations, in response to immediate conditions, and long term changes, which are sometimes not so apparent to the operator, the Guadalupe farm is one on which the short term changes, while keyed to the present, are consciously directed toward a long range program. In crops the shift has been from a cotton-corn-oats rotation in which the three crops occupied approximately the same acreage, to a corn-wheat-oats-clover rotation. The present stocking is an intermediate stage designed to allow the pasture to recover before the planned stocking program is put into effect. Changes in the physical plant of the farm designed to increase its efficiency and expand its storage space are also a part of the program. However, more than a change in management is evident in the present status of the farm. The current prosperity attending on high farm prices is reflected in equipment such as the tractors and the combine, and in conveniences such as the electric washing machine and the electric stove. High prices in the realm of construction materials and labor, following in the wake of shortages, act as a brake on the planned improvements in the homestead and fencing.

An upland ranch in Comal County

Eight miles from New Braunfels, on the main highway that strikes west into the Hill Country, there is a ranch of somewhat larger size than the average.[1] Located on the upland near the head of Dry Comal Creek, it stands on the northern edge of a belt of rolling land with its "panhandle" pasture reaching into the steeper slopes which characterize the Guadalupe River's more immediate watershed (Fig. 16).

In plan the ranch shows no direct correspondence with the physical landscape, but rather the property lines appear to be

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[1] The information on which this study is based was obtained from the owner of the ranch, from the local Soil Conservation Service office, and from observation in the field.

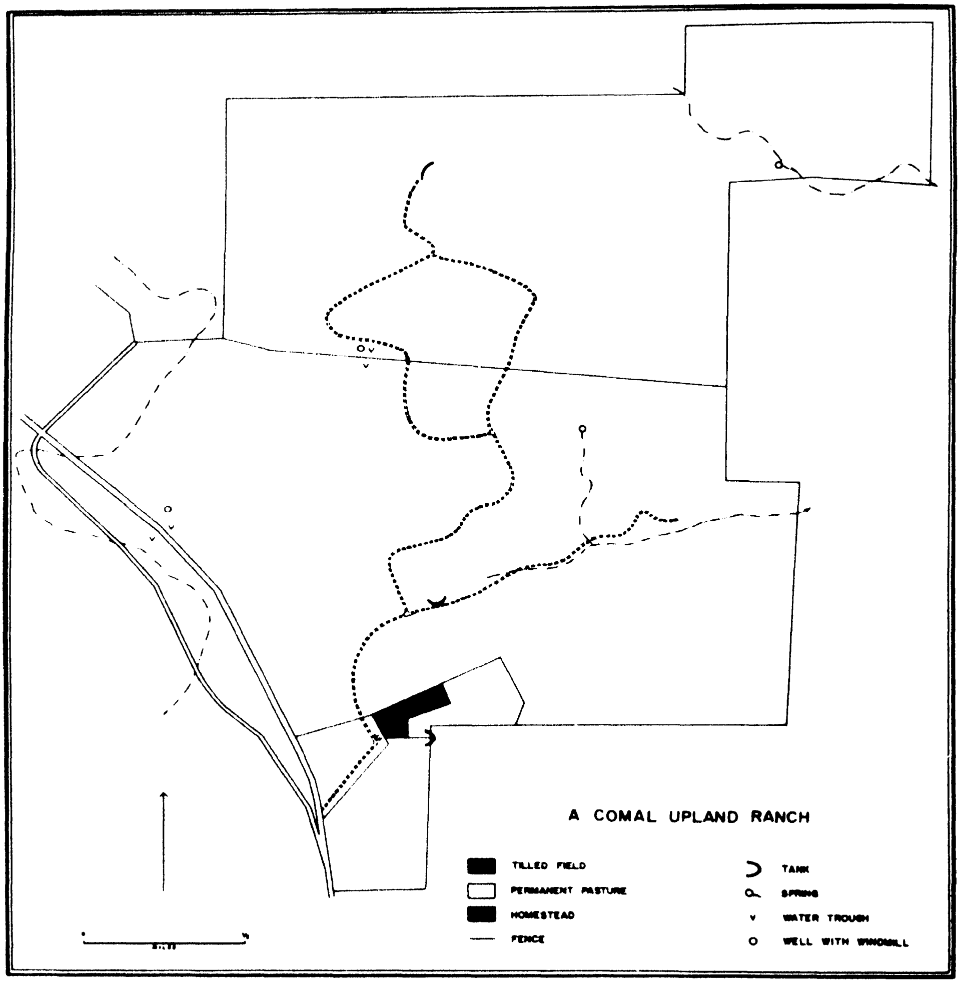
A COMAL UPLAND RANCH
TILLED FIELD
PERMANENT PASTURE
HOMESTEAD
FENCE
TANK
SPRING
WATER TROUGH
WELL WITH WINDMILL

Figure 16

arbitrarily squared off. Portions of local divides and sections of stream valleys fall within the boundaries. The slopes, however, are not steep enough to render the topographic diversity disadvantageous. Neither does the irregularity in shape constitute a problem, since the ranch as a whole forms a compact unit. Although the property had attained its present outlines when the owner purchased it, he surmised that the "panhandle," its most conspicuous projection, was bought for the sake of the spring it contains. The internal arrangement of the ranch implies in its simplicity an area essentially homogeneous in use capability. The greater part of the ranch is divided into two pastures of approximately equal size by a straight fence line. A third pasture has been cut off by the relocation of the old highway which constitutes the south boundary. The homestead, though off-center in position, has the advantage of being near the highway and beside the tilled field. Furthermore, the necessary traps could be constructed with less cost where parts of the field and of the exterior fences were readily incorporated in the lines.

One of the most striking features of the ranch's physical plant is the number and distribution of watering places. In the largest pasture there are no less than four so spaced as to induce an even grazing of the range. The wells on the ranch are rather deep, two of them exceeding four hundred feet, but are located so that each waters more than one pasture.

Within the ranch, gates and dirt roads provide for motor transportation. The roads run with the slope to a considerable degree. Although some cedar posts and feed are hauled over them, their primary function is to allow the rancher to get about more rapidly than he could on horseback. Gates along the outer fence permit the neighbors' strayed stock to be returned directly to their pastures.

Throughout the ranch the range is an open woodland of parkline aspect. Large deciduous oak and liveoak trees grow singly or in clumps, shading a fair stand of bunch grasses and turf grasses. The cedar brakes, however, are so dense as to allow little ground cover. The clearance of excess woody vegetation has been prosecuted vigorously and continues at present. The method of clearing cedar is to cut the trees, allow them to dry, and then burn over the area. This procedure, though drastic, eliminates the tangle of brush which would otherwise occupy a great deal of space for a considerable period. Most of the cedar brakes on the ranch have been cleared, but of the remainder, one section will be retained for its wood. The large oak trees are dealt with by a bulldozer which breaks them loose and pushes them into great piles or windrows.

On the thin soiled limestone upland, a ten-acre plot has been found suitable for cultivation, although it is strewn with flints. Planted to corn or milo maize, it provides pig and chicken feed.

In its diversified stocking, the ranch is typical of the Guadalupe Hill Country. Cattle, sheep, and goats are herded together in its pastures.

Unlike the Guadalupe Valley farm, the Comal ranch sells no lambs; rather it places great emphasis on the production of wool. Not only ewes, but wethers are retained, because the wethers, being somewhat larger, yield more wool. To maintain the flock at a desirable age and size, old ewes and mature wethers are sold in the spring, being replaced by the lamb increase. Since no lambs are sold, March rather than midwinter is the lambing season.

Angora goats, because they are raised primarily for mohair, are managed in the same fashion throughout the Guadalupe Counties. The system used for keeping the flock at the desired age and size duplicates that described above for the sheep. In the care they require, however, the angora goats differ markedly from the sheep. Though sheep may be sheared only once a year (the practice on this ranch), goats are always sheared twice (Fig. 14). In addition they must be kept in a small enclosure provided with shelter for about a month following the spring shearing, and for two weeks after the fall shearing. At kidding time also they are penned. During the period when they are kept up they require supplemental feed.

The cattle herd on the Comal ranch is typical of the Hill Country in type and management. A breeding herd of ninety-five Hereford cows produces calves which are sold at weaning age (Fig. 14). The cattle are fed cotton seed cake and hay during the winter. This year feeding was started in January and continued until March, at which time the spring grass and weeds generally become succulent enough to induce the cattle to rustle for themselves again.

A further product of the range is the deer which share the pastures with the stock. Although their presence necessitates the maintenance of a deer-proof fence over six feet high around the field, it also brings in a substantial income through the leasing of hunting privileges.

Although there are some items produced for home use, the bulk of the ranch products enter commercial channels. From the concentrating point at the headquarters, the livestock travel out to San Antonio, only thirty-four miles away, arriving with a minimum loss in weight. Wool and mohair move to New Braunfels for sale and shipment. Both classes of products are transported by truck over excellent highways.

For home consumption the ranch yields garden produce, eggs, milk, and pork. However, this list leaves a great many items to be supplied from commercial establishments, including a certain amount of both feed and food. New Braunfels, easily accessible and large enough to provide a range in selection, is the chief shopping center.

The Comal ranch appears to be operating on a well established system. Nevertheless, it is flexible enough to allow such changes as an experiment with a reduced stocking rate in the back pasture. Although the appearance of the ranch headquarters suggests prosperity of long standing, the plans for such further improvements as the creation of additional pastures for the better control of grazing reflect present prosperity, just as the delay in carrying them out bears witness to current high prices.

The Ranching Pattern of the Divide

The natural-cultural complex of the Divide is in some aspects distinct from that of the Hill Country, while in others it forms part of a transition in the conditions that obtain in the Edwards Plateau from the subhumid east to the semiarid west. From the standpoint of occupance, the Divide differs in the larger average size of the ranch holdings, a trend which is in a very general fashion observable from east to west across the Hill Country, and which continues westward beyond the Guadalupe Counties (Table 6, Fig. 17). The lower proportion of cultivated land found on the Divide becomes more marked in the county immediately west of Kerr (Table 6, Fig. 17). In a similar fashion the lower density of cattle and the relatively greater importance of sheep and goats carries over into Edwards County (Tables 7 and 8). However these trends are localized rather than region-wide. In spite of the implications of the lower cattle densities, the Divide has the

TABLE 6

SELECTED RANCH AND FARM CHARACTERISTICS, 1944-1945

	Average Size of Ranches and Farms (Acres)	Average Amount of Cropland Harvested per Farm Having Harvested Land (Acres)	Ratio of Harvested Land to Total Land in Farms (Per Cent)
Comal County[a]	451.0	58.0	9.7
Kendall County[a]	505.2	52.4	8.2
Kerr County[a]	1,000.9	55.0	4.5
Precinct 4[a,b]	1,574.0	45.0	2.5
Edwards County[c]	4,722.4	16.6	.2

[a] Computed from unpublished minor civil division data from the 1945 census of agriculture, furnished by the Bureau of the Census.

[b] Precinct 4 contains the Divide plus valley and slope land belonging to the Hill Country, therefore the figures may not be strictly typical of the Divide.

[c] First column compiled, second and third columns computed from Census of Agriculture: 1945, Vol. I, Part 26, Texas, p. 31.

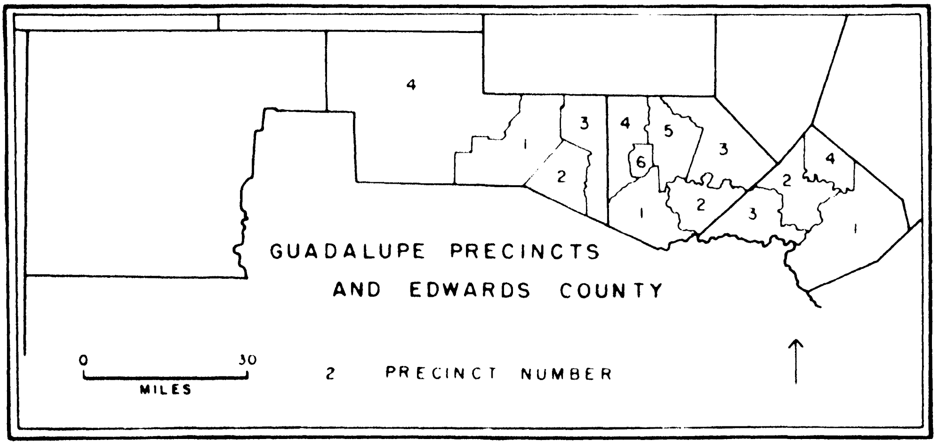

Figure 17

reputation of providing better range, and in particular better cattle pasturage than the dissected area to the east.[1] Physically

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[1] Statement of Mr. Powell, the county agricultural agent.

TABLE 7

SELECTED LIVESTOCK IN THE GUADALUPE COUNTIES AND EDWARDS COUNTY, 1940

	Animal Units[e] of Cattle	Animal Units[e] of Sheep	Animal Units[e] of Goats
Comal County[a]	12,634	5,834	6,067
Kendall County[b]	8,951	14,004	10,367
Kerr County[b]	11,653	33,778	25,179
Precinct 4[c]	5,701	19,973	17,813
Edwards County[d]	10,812	47,970	55,521

[a] Data from Census of Agriculture: 1945, Vol. I, Part 26, Texas, p. 276.

[b] *Ibid.*, p. 294.

[c] Data from unpublished minor civil division data from the 1940 census of agriculture, furnished by the Bureau of the Census.

[d] Data from Census of Agriculture: 1945, Vol. I, Part 26, Texas, p. 311.

[e] Animal units figured on the basis of five sheep or goats to one cow, following the usage of the local Soil Conservation Service offices.

TABLE 8

SELECTED LIVESTOCK DENSITIES IN THE GUADALUPE COUNTIES AND EDWARDS COUNTY, 1940

	Animal Units of Cattle[a] per Square Mile	Animal Units of Sheep[a] per Square Mile	Animal Units of Goats[a] per Square Mile
Comal County[b]	22.2	10.3	10.7
Kendall County[b]	13.3	20.9	15.8
Kerr County[b]	10.5	30.7	26.5
Precinct 4[b]	8.3	29.2	26.1
Edwards County[c]	5.4	24.3	28.1

[a] Data from Table 7.

[b] Area computed from unpublished minor civil division data furnished by the Bureau of the Census.

[c] Area computed from Census of Agriculture: 1945, Vol. I, Part 26, Texas, p. 31.

the Divide is distinct from the Hill Country. The relative homogeneity of its rocky upland surface contrasts with the varied terrain of the dissected country, where small areas of terrace, hill slope, and upland are mingled. The absence of both the river lands and the precipitous slopes is further reflected in the total complex through the absence of towns and resorts, and the wide spacing of homesteads. The persistence of this condition is indicated by a statement of Dr. Robert T. Hill, who visited the area in the 1890's. "So little are they [the slopes and summits] fitted for agriculture that the extent of the summit of the Edwards Plateau can almost be traced on a map by the scarcity of post-offices and other evidences of population."[1]

Qualities of the Land

The Divide of western Kerr County and the adjacent parts of Edwards and Real counties is an undissected plateau remnant that is referred to by Hill as "the main summit region."[2] It stands above the headwaters of six river systems which flow outward to the north, east, and south.[3] Being a stripped plain[4] rather than a depositional landform, the Divide is undulating rather than level (Fig. 2). Across the surface of the resistant Edwards Limestone, which underlies most of the area, broad, shallow streamways known as draws have been cut. In their vicinity the topography becomes gently rolling, in contrast to the local divides between the draws, where the land may be nearly level.

The soils of the Divide are like those of the Hill Country uplands (Fig. 11, Table 1). Dark brown to black clays cover large areas. Generally they are stony, containing large fragments or angular masses of limestone. Chert and flint cobbles are thickly strewn over some areas. Characteristically, the soils are shallow, and in places the bedrock is exposed; however, deeper soils are found in the larger draws and occur irregularly on the upland.

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[1] R. T. Hill and T. W. Vaughan, "Geology of the Edwards Plateau and Rio Grande Plain," U.S. Geological Survey, Eighteenth Annual Report (1896-97), Part II, p. 212.

[2] Ibid., p. 206.

[3] The six river systems are the Llano, Pedernales, Guadalupe, Medina, Frio, and Nueces.

[4] N. M. Fenneman, Physiography of the Western United States (New York: McGraw Hill Book Company, Inc., 1931), p. 52.

A number of small fields have been cleared and put into cultivation in the northeastern part of the Divide (Fig. 10). Although the country is less rolling than the dissected area, these fields are not free from the menace of erosion. On one of the ranches in this section, there is a field which, after being tilled without protection for about fifty years, had become so rough and gullied that it was no longer fit for cultivation. The present owner has terraced it and put it into permanent grass. With respect to improving fertility, the same practices are recommended as for the Hill Country. Humus and nitrogen are supplied by the plowing under of legumes, and phosphate is added in the form of superphosphate.

One of the greatest contrasts between the Divide and the Hill Country is the nature of their water supply. The difference results from topographic and stratigraphic conditions rather than from a lower rainfall, since the Divide probably averages only three inches less precipitation a year than the eastern part of Kerr County.[1] Unlike the Hill Country, with its spring-fed rivers, the Divide is drained by intermittent streams which characteristically carry water only following a rain. Although wells may be drilled successfully on almost any part of the Kerr County Divide, the majority of them must be quite deep to penetrate water-bearing strata.[2] Perhaps one well out of ten will reach water at three hundred to four hundred feet, while the remainder must be drilled to depths of eight hundred or one thousand feet.[3] Generally the groundwater percolates through the Edwards Limestone into the underlying Glen Rose Limestone before it moves laterally.[4] Thus in the Divide as in the Hill Country, the prevalent limestone aquifers cause the location of the water table to be somewhat unpredictable.

In the general features of its range vegetation the Divide resembles the Hill Country, the physiognomy being that of an open woodland or of clumps of low trees set in broad grassy spaces. As in the Hill Country, this wooded aspect represents a change from the earlier prevalence of grass vegetation. As late as the 1890's it was described as follows: "All trace of shrubs or trees disappears, save here and there a patch of shin oaks and dwarf evergreens, and in time of verdure the eye beholds apparently a never-ending sea of grass, through which appear many bright-colored flowers."[1] Compared with the present range vegetation of the adjacent part of the Hill Country, that of the Divide is somewhat more desirable. On the areas of lower slopes and deeper soils[2] grows a dwarfed liveoak which provides excellent browse and shelter. Nearly always the liveoak is of sprout-growth form on the Divide, while in the valley lands it has usually grown into trees. On the higher, thin-soiled areas shinoak becomes the dominant woody vegetation. Although it is deciduous, its lower, shrub-like growth form causes it to provide much more browse than the Spanish oak, which occupies thin-soiled slopes in the Hill Country. Relatively small areas are dominated by the blackjack oak and post oak, which resemble the Spanish oak in producing a rather dense crown out of reach of the browsing livestock. Cedar has invaded only a small area in the southwestern corner of the Kerr County Divide. The ground vegetation also appears to be more favorable than in the adjacent part of the Hill Country. Fully half the Divide has the turf-forming curly mesquite grass, while about the same proportion of the Kerr County Hill Country is dominated by the less desirable three-awn grasses. However, on the Divide as in the Hill Country, the high quality bunch grasses are rare, and three-awn grasses, together with undesirable forbs have taken over considerable areas.

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[1] C. A. Bonnen and B. H. Thibodeaux, A Description of the Agriculture and Type-of-Farming Areas in Texas, Texas Agricultural Experiment Station Bulletin No. 544 (College Station: Agricultural and Mechanical College of Texas, 1937), p. 13.

[2] Information from a rancher who combines thorough acquaintance with the area and experience as an oil-well driller.

[3] Ibid.

[4] Information from Mr. Pritchett of the Texas Board of Water Engineers.

The major rangeland problems of the Divide, as of the Hill Country, are overstocking and brush control. Because of its widespread occurrence, shinoak is the most troublesome of the woody plants.[3] Although desirable in proper proportions, it spreads rapidly under light grazing through the production of suckers.[1] One method of attacking it was described by a Divide rancher. After the stand had been bulldozed, it would be so heavily stocked with goats for a period of three years that all the leaves would be eaten off the shinoak during the summers. However, the effects of this treatment are felt by the desirable vegetation as well as the shinoak, and the land is so denuded that it must be rested.

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[1] Hill and Vaughan, op. cit., p. 211.

[2] The following description of the Divide and Hill Country vegetation is based on Buechner, op. cit.

[3] "District Program for Kerr County Soil Conservation District, Texas," p. 13.

Closely related to the wild vegetation is another valuable resource, the white-tailed deer. A census taken in Kerr County revealed approximately four times as many deer in the liveoak and shinoak areas of the Divide as in the liveoak and Spanish oak areas of the Hill Country.[2] Since the deer are primarily browsing rather than grazing animals, they are attracted to the areas providing more browse.

Use and Products of the Land

The Divide resembles the Hill Country in its use of the rocky, thin-soiled areas for grazing, and in the cultivation of feed crops on more favored spots. Furthermore, the same types of crops and livestock are produced in both areas. Hereford cattle, kept primarily for the raising of calves, are typical, as are fine wool sheep such as the Delaine and the Rambouillet. Some ranchers in the Divide have also introduced the Corriedale breed in order to obtain larger lambs. Angora goats, as in the east, are usually a part of the ranch enterprise. The major crops, sorghum, corn, and oats, repeat the association found in the Hill Country.

In emphasis, however, and in certain other details, the Divide stands apart from the Hill Country. In its low cattle density and high density of sheep and goats, the Divide differs from the more easterly parts of the Hill Country and takes its place in a transition which carries over into the county immediately to the west. Moreover, the wool which comes from this area of larger ranches is usually cleaner than that of the Hill Country to the south and east.[3] There is less plant debris such as clover burrs and awns from needle grass in the wool from the Divide. Undoubtedly the practice of tagging (that is, trimming off the soiled leg and belly wool) also contributes. One Divide rancher estimated that 75 per cent of those in his vicinity had their sheep tagged. The process of tagging is linked with the production of twelve-month wool, and both are characteristic of large scale operations. In the Hill Country, a number of the smaller ranches produce eight-month and four-month wool, partly because the yield is slightly higher, but chiefly because it is considered to be better for the sheep. Not only does the presence of awns make the removal of the wool desirable; in addition, the lighter fleece will dry more rapidly following the cold winter rains. Tagging is seldom considered worth the cost in the management of a small flock for the production of twelve-month wool.

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[1] Buechner, op. cit., p. 716. [2] Ibid., p. 739.

[3] Information from Mr. [redacted] Commission, Kerrville.

The crops of the Divide, like its livestock products, are the same that are raised in the Hill Country, but they differ in rank (Table 9). The 1939 crop acreages reveal a variation in emphasis from east to west with the crop association of the Divide showing points of similarity to the areas on either side. A further suggestion of the Divide's transitional character is the fact that the leading crop has been different in each of the three years for which precinct figures are available. In 1944 oats

TABLE 9

RANK OF CROPS BY ACREAGE IN SELECTED CIVIL DIVISIONS, 1939[a]

	Number 1	Number 2	Number 3
Comal County	Corn	Oats	Sorghum
Kendall County	Oats	Corn	Sorghum
Kerr County	Oats	Sorghum	Corn
Precinct 4	Sorghum	Corn	Oats
Edwards County	Sorghum	Tame Hay[b]	Small Grain Hay

[a] Sources: For Comal, Kendall, and Kerr counties and Precinct 4, unpublished minor civil division data from the 1940 census of agriculture; for Edwards County, Census of Agriculture: 1945, Vol. I, Part 26, Texas, pp. 125, 177, 229.

[b] Hay other than sorghum, alfalfa, or small grain hay.

ranked first, in 1939 sorghum was first, and in 1934 corn led in acreage. No such fluctuation is observable in the minor civil divisions of the Hill Country.[1] In the use made of its crops the Divide resembles many parts of the Hill Country, but differs from those sections having large expanses of valley land. Instead of producing a surplus of crops for sale like the area near Center Point, the portion of the Divide having the greatest concentration of cropland (Fig. 10) markets 90 per cent of its crops in the form of stock and stock products. Ninety-five per cent of the crops are fed or grazed in this area.[2] In general, however, the Divide is a region of feed deficit, and imports large quantities.[3]

Functional Patterns of Divide Ranching

On the relatively homogeneous Divide upland the system of ranching followed is essentially the same as that found in the more varied Hill Country but the scale of operations differs somewhat. To one traveling through the area, the presence of the same kinds of stock and crops and homesteads, together with the characteristic tightly strung mesh and barbed wire fencing, is evidence of the similarity. Some of the differences between the two are also apparent, perhaps to the point of producing an exaggerated impression. The purely physical contrast is more striking in range country than in farm lands because of the scarcity of man-made features in the landscape of the former. Physical difference may therefore carry undue weight. In this instance the contrast is accentuated by the tendency of roads to follow the valleys in the Hill Country. An uninformed traveler might expect the ratios of cropland to rangeland in the two areas to differ more widely than is the case. Further, in scarcity of ranch headquarters, implying as it does larger scale operations, the routes through the Divide should be compared with those of the rough sections as well as of the valley lands in the Hill Country. When these factors are taken into account, however, there remains clear evidence in the landscape, as well as in the statistical data, of a differing scale of operations. The larger units of the Divide are consistent with the greater proportion of rangeland and the resulting lower intensity of land use. A lower population density corroborates the other lines of evidence (Table 10, Fig. 17).

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[1] Statement based on unpublished minor civil division data from the 1935, 1940, and 1945 Censuses of Agriculture furnished by the Bureau of the Census.

[2] These estimates were made by the soil conservation district supervisor who represents the area in question.

[3] Based on information from Mr. Carter, conservationist for the Kerr County soil conservation district, and from ranchers and feed dealers.

TABLE 10

RURAL-FARM POPULATION DENSITY IN THE GUADALUPE COUNTIES, 1940[a]

	Population per Square Mile
Upper Guadalupe Counties	4.3
Comal County	6.6
Precinct 1	8.2
Precinct 2	5.0
Precinct 3	5.2
Precinct 4	5.2
Kendall County	4.3
Precinct 1	5.8
Precinct 2	4.7
Precinct 3	3.2
Precinct 4	4.9
Precinct 5	2.8
Precinct 6	6.9
Kerr County	3.2
Precinct 1	4.4
Precinct 2	5.6
Precinct 3	4.1
Precinct 4	2.3

[a] Computed from Sixteenth Census of the United States: 1940. Population, Second Series, Texas, pp. 204, 218; and Sixteenth Census of the United States: 1940. Areas of the United States, 1940 (Washington: Government Printing Office, 1942), pp. 262, 266.

The gross functional pattern of the Divide like that of the Hill Country includes both ranches with cropland and those without. In the northeastern part, where cultivated fields are more numerous, there are a number of smaller ranches in whose economy crops have an important role. Farther west and south, however, cropland, where present is usually incidental in the scheme of operations, and rangeland is commonly organized into units of 3,000 acres, 5,000 acres, or more.[1]

The sample selected to exemplify the minor functional patterns of the Divide is representative in size and in the nature and seasons of the ranch activities, but unusual in the high quality of its range.

A Divide ranch

Located in the southwestern part of Kerr County, the Divide ranch occupies about 5,000 acres at the headwaters of the Guadalupe, Frio, and Medina rivers.[2] In outline it forms a compact though slightly irregular rectangular unit measuring approximately four miles east and west. Within this frame the fence lines have been constructed in accordance with a carefully thought-out plan of range management. The largest pasture has two well located watering places which serve to distribute rather than concentrate grazing pressure (Fig. 18). The other six pastures water at the ranch headquarters, from which they all radiate. Not only is this a saving from the standpoint of the number of wells to be drilled; it also contributes to the ranch's efficiency by bringing the stock to headquarters at frequent intervals without their being rounded up. Since the salt is kept at the headquarters, even the stock from the east pasture comes in every few days. During the recent spring shearing season, all the stock were gathered simply by catching them at water. Starting several days in advance, the rancher turned them into the "catch pasture" (the narrow pasture stretching north along the road) until they were wanted. Because of its shape and the fact that it has been cleared of timber, the "catch pasture" can be worked in a very short time. The obvious advantage of a centralized headquarters location is not offset in this case by the disadvantage which often accompanies a radial arrangement of pastures. Where the pattern is one of triangular enclosures converging on the headquarters, the range is less evenly grazed than where rectangular pastures are formed.[3] On the Divide

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[1] Information from Mr. Powell, county agricultural agent of Kerr County.

[2] The information on which this study is based was obtained from the owner of the ranch, from the county agent, and from an article appearing in the Sheep and Goat Raiser.

[3] Youngblood and Cox, op. cit., p. 185.

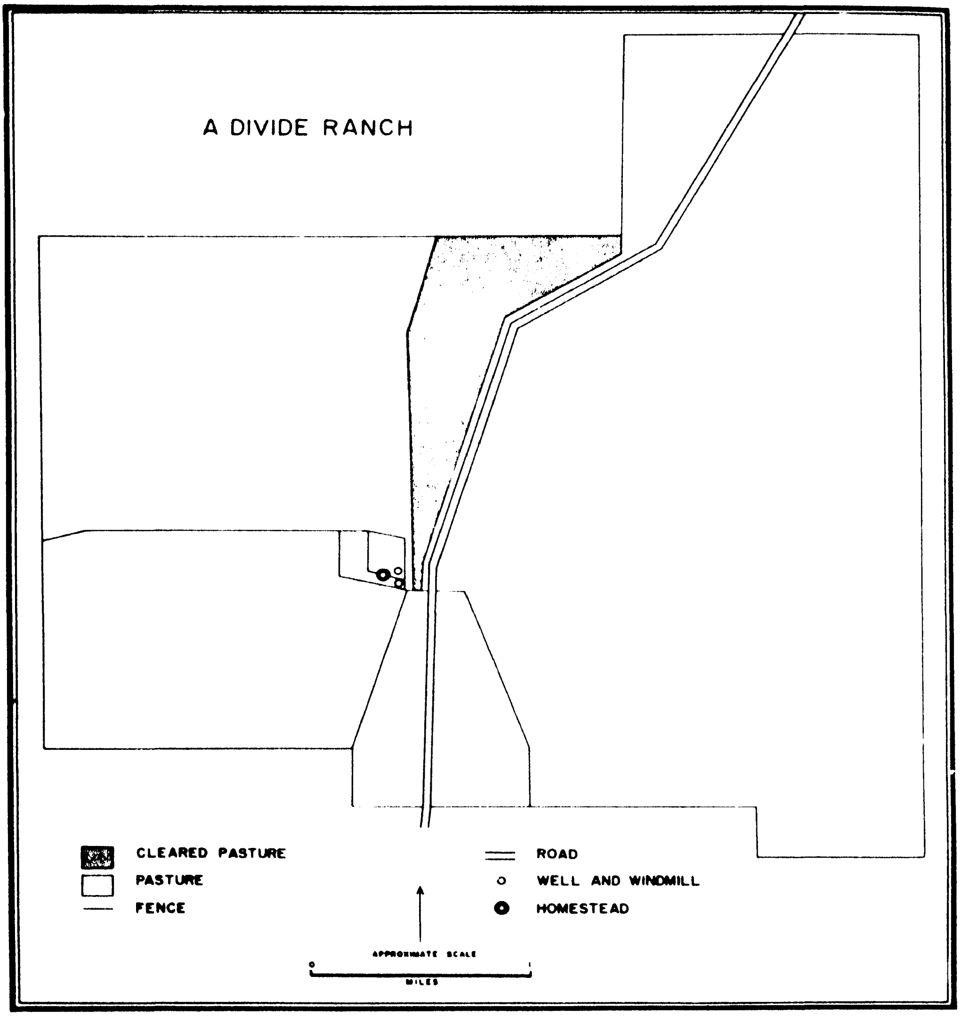
A DIVIDE RANCH
CLEARED PASTURE
PASTURE
FENCE
ROAD
WELL AND WINDMILL
HOMESTEAD
APPROXIMATE SCALE
0
1
MILES

Figure 18

ranch the only pronouncedly triangular pasture was designed for a special purpose.

Physically the Divide ranch resembles other sections of the Divide in being a rocky, clay-soiled area supporting liveoak, post oak, and blackjack oak browse plants. It differs from the greater part of the Divide in the presence of cedar and of a particularly good stand of grasses. The cedar is cut and burned, along with the other undesirable brush. The condition of the grass results from careful attention to the effects produced by different types of stock as well as from the rotation of stock in the pastures and the practice of deferred grazing.

The livestock program of the ranch includes cattle and goats the year around, but sheep are present only during certain years and certain seasons. A breeding herd of one hundred Hereford cows is the product of twenty years of careful record keeping and culling. The calf crop has been increased from 77 per cent to 91 per cent by the substitution of balanced rations for cake in supplemental feeding. The rancher finds it profitable to feed the cows during January, February, and March because this period of lowest forage supply coincides with the breeding and calving season. Calves are sold at eight months of age because they bring a quicker return and leave the cows in better condition than would be the case if they were sold as yearlings.

The angora goats do not constitute a breeding flock. Wethers are purchased as two-year olds and sold when they reach six years of age. Although their numbers vary with the condition of the range, as many as one thousand are carried at times. In the elimination of does and kids from the scheme of operations, the rancher was influenced by their effect on the range. Not only must breeding flocks be kept in smaller pastures, but at certain seasons they must be held so long in the small enclosures as to injure the range seriously. The wethers, which do not require such careful watching, are rotated frequently among the big pastures and consequently do not damage the stand of grass.

The sheep, like the goats, are not a breeding flock. During the years when they are present, they are bought as lambs in the fall and sold in June following the shearing season. The rancher has decided that they do no damage to the better grasses and weeds under this system, but that if they are kept the year round they will kill out the desirable species. Neither the sheep nor the goats are given supplementary feed.

Although it stands in the corner of the county approximately thirty-five miles from Kerrville, the Divide ranch, like many others in Kerr County, sends its livestock to the San Antonio market and its wool and mohair to Kerrville.

The Farming Pattern of the Prairie

To one emerging from the Hill Country onto the Comal Prairie, the most striking contrasts are the prevalence of long slopes, low at the base but steepening toward the head; the impression of open country after being hedged about by short, steep, wooded hillsides; and the ubiquitous dark soil, replacing the stony surfaces of the Hill Country. On closer inspection, the evidences of a more intensive occupation of the land appear. Farmsteads are closely spaced, and the meshes of the road net are much finer than in the Hill Country. Towns are met with more frequently and are obviously larger. A count reveals that the Prairie, though it constitutes only a narrow border along the square mass of the county (Fig. 10), nevertheless contains ten of the eighteen towns in Comal. Further, the map shows that the only railroads in the county traverse the Prairie (Fig. 8). Here is obviously an area distinct in both its physical and cultural complexes from the Hill Country.

Qualities of the Land

The greater part of the Comal Prairie forms the floor and one side of a broad, shallow, rather indefinite trough. Comprising the other side, the wooded Balcones Escarpment rises wall-like one hundred to one hundred twenty feet. South of New Braunfels, the trough, drained through most of its length by Dry Comal Creek, is continuous, but north of the town it is less clearly marked, being cut across by transverse stream channels. A series of spurs and dry gullies stretch down to the trough from a row of hills along the county line (Fig. 7). There is a break, however, just north of the Guadalupe River, where an old terrace of considerable breadth extends from the escarpment into the next county (Fig. 6). Thus the slopes found in the Comal Prairie range from the nearly level sections of the trough and terrace areas to the rolling hills whose crests rise as high as the top of the Balcones Escarpment opposite. Within the space of a mile or two, the local relief, from a divide to the nearest stream, may be only twenty feet or as much as one hundred twenty feet.

Across the Prairie, the Guadalupe River flows in a sinuous course between banks that rise steeply forty feet to the adjacent terrace level. Though flash floods are of frequent occurrence, the terraces on either side stand above all but exceptional floods, and most of the bottomlands are in forest and pasture rather than cultivation. A major tributary of the Guadalupe is the remarkable Comal River. Its permanent flow originates at the very base of the precipitous Balcones Escarpment in a series of clear springs which average 210,000,000 gallons a day.[1] Both the flow and the temperature of the springs are remarkably constant. The river flows two miles through the town of New Braunfels to join the Guadalupe. Below the dams at Landa Park, the steep banks of the Comal stand twenty to sixty feet above the meandering stream. Though the Comal rarely originates floods, it receives backwaters from the Guadalupe River. The remainder of the Prairie streams are intermittent, but they form a rather closely spaced network over the whole of the area, providing good drainage.

The soils which mantle the Prairie are for the most part residual on marls, though terrace deposits form the parent material for the soils immediately north of the Guadalupe (Table 1, Fig. 11). Since the alluvium came from the limestones and clays of the Hill Country, however, it is quite similar to the parent material of the residual soils. Brown to black clay soils usually three or more feet deep predominate. Because of their heavy texture they present difficulties under cultivation. When wet, they are sticky to plastic; if left untilled through the dry summer, they bake hard and crack; however, when plowed at the right stage, they break into a loamy consistency. Their heavy texture causes the soils to hold water well,[2] and their depth gives considerable storage capacity, but the combination of small soil openings with heavy, dashing showers means that the soil loses much water by runoff.[3] A peculiarity of these heavy Prairie soils is that a shower of less than half an inch normally results in a net water loss, probably because it establishes capillary connection with the deeper zone of soil moisture, and more water evaporates than is stored.[1] Very likely this condition is more pronounced in summer than in winter.

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[1] George, Hastings, and Breeding, op. cit., p. 36.

[2] Kocher and party, op. cit., p. 1121.

[3] "District Program for Comal-Hays-Guadalupe Soil Conservation District No. 306, Texas" (Unpublished report available in the Fort Worth regional office of the Soil Conservation Service, dated 1941), p. 10.

Like the nearby soils of the Hill Country, the Prairie soils suffer from a deficiency of nitrogen, phosphorous, and humus,[2] and from both sheet and gully washing. Most of the area is attacked by erosion to some extent, with the most severe effect in the rolling sections, and little or none in the level terrace areas.[3]

The fine textured soil and substratum of the greater part of the Comal Prairie promise little in the way of satisfactory shallow wells. In this area the farmers generally depend on cisterns and tanks. It is significant that out of a sample of sixty-one wells selected for study on the Prairie, only four drew water from the Taylor Marl, which is the surface formation over practically the whole area.[4] Unlike the Hill Country, the Comal Prairie is unfortunate in the nature of the deeper groundwater supply as well. The majority of the wells studied were in the Edwards Limestone, most of them being over three hundred feet deep, and the water obtained was impregnated with sulphur.[5] Only on the old terrace, where the alluvium has been deposited over the impervious Taylor Marl, is there dependable groundwater available at shallow depths. Here the wells are twenty-five to sixty-five feet deep and failures are unknown.[6]

Unlike their water supply conditions, which contrast because of structural differences, the climatic characteristics of the Prairie and the Hill Country which are important to agriculture are essentially the same. A comparison of the data for New Braunfels with those for Boerne and Kerrville reveals this similarity (Tables 3 and 4, Fig. 12).

The wild vegetation of the Prairie is much less important to the area than that of the Hill Country or the Divide, because cultivated land or temporary pasture occupies most of the acreage. The original vegetation was prairie grasses except along the streams, where riverine forests like those of the Hill Country occurred.[1] At present the mesquite groves typical of the Rio Grande Plain[2] to the south are found in small areas of permanent pasture, being especially prevalent along the dry gullies and intermittent streams. Forests of pecan, sycamore, elm, and other deciduous trees persist along the major streams of the Prairie.

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[1] Ratliffe and Atkins, *op. cit.*, p. 6.

[2] Information from Mr. Dawson of the Soil Conservation Service office at San Marcos.

[3] "District Program for Comal-Hays-Guadalupe Soil Conservation District No. 306, Texas," p. 14.

[4] George, Hastings, and Breeding, *op. cit.*, pp. 99-110.

[5] *Ibid.*, pp. 46, 99-110.

[6] *Ibid.*, pp. 29, 99-110.

Use and Products of the Land

The Comal Prairie differs from the areas discussed above in that cropland and temporary pasture, rather than permanent pasture predominate. Although this gives the landscape a very different aspect, the types of crops and livestock found on the Prairie are generally the same as those of the Hill Country. The emphasis, however, is different. Corn ranks first in acreage and sorghum second.[3] Furthermore, there is a much lower percentage of the cultivated land devoted to oats, and very little wheat is raised. Since the climatic conditions are like those in the Hill Country, the seasons and systems of culture are essentially the same. There is only one crop on a given field during a year, but the farm has some crops on the land virtually every month of the year. Thus unfavorable conditions at one season may be offset by better conditions at another. As in the Hill Country, water deficit is one of the most serious limiting factors in productivity.[4]

Though the livestock are of the same breeds as in the Hill Country, the Prairie has a much greater cattle density, and very few sheep and goats.[5] Also the stock are raised under different conditions. Although some farmers keep them on permanent pasture almost entirely, many feed their crops to the stock, marketing directly only the surplus grain and fodder.

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[1] W. L. Bray, "The Ecological Relations of the Vegetation of Western Texas," Botanical Gazette, Vol. XXXII (1901), pp. 122, 267.

[2] *Ibid.*, p. 265.

[3] Based on unpublished minor civil division data for 1944 furnished by the Bureau of the Census.

[4] Ratliffe and Atkins, *op. cit.*, p. 37.

[5] Based on unpublished minor civil division data for 1939 and 1944 furnished by the Bureau of the Census.

The present importance of feed crops and stock is a rather recent development. From 1890 to 1924 cotton led all other crops in harvested acreage in Comal County.[1] Its decline was influenced by low prices during the depression, by the present high cost of labor, and by low yield, itself a product of a number of factors including soil depletion, and trouble with such insects and diseases as boll weevil and cotton root-rot.[2] By 1946 there were only 140 acres planted in the whole of Comal County.

Functional Patterns of Prairie Farming

Developed on a relatively homogeneous expanse of arable land, the gross functional pattern of Prairie farming is clearly formed of smaller units than that of the Hill Country or the Divide. Through the closer spacing of the farmsteads, the Prairie landscape indicates the smaller property sizes which its greater productivity permits. This higher intensity in land use is borne out by the greater population density of Precinct 1 (Table 10, Fig. 17).

A blackland farm

In the easternmost corner of Comal County, some eight miles from New Braunfels over the old Austin Post Road, lies a farm which was put into cultivation about sixty-five years ago.[3] In size, this two hundred acre property is fairly typical of the Comal Prairie.[4] Its general physical make-up could also be duplicated on many of the farms in this section, but it is to the hilly lands not to the flat terraces that the farm belongs.

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[1] Since nearly two-thirds of the harvested acreage in Comal County is in Precinct 1, and the greater part of that is in the Prairie section, these county figures are probably quite representative for the Prairie.

[2] This statement is based on interviews with farmers and agricultural experts and on the findings of Ratliffe and Atkins, op. cit., p. 29.

[3] The information on which this study is based was obtained from the owner of the farm and from observation in the field.

[4] A list of co-operators in the Production and Marketing Administration program of Comal County showed many farms of 150 and 200 acres.

Lying in the valley between three of the most prominent Prairie hills, it is drained by one of the intermittent streams which head in the Balcones Escarpment and flow away to the southeast, transverse to the trend of the Prairie. Around the farm, hill crests rise forty to sixty feet above its borders and their upper slopes are steep, but on the farm itself, the lower spurs of these hills are somewhat gentler in inclination. The highest land is in the southern corner, from which the fields drop away to the stream in the north.

The physical plant.--The shape of the property results from the joining together of two farms (Fig. 19). One comprised the block west of the road and the big south field. The other included the remainder of the land east of the road. The homestead on the west place was built at its present site when the south field was the only cultivated land on the farm, the remainder being used as pasture. Thus it was conveniently placed between the cropland and the pasture. Also its site is well drained. The homestead on the east place was very much off-center, but it stands at the crest of a hill, above the poorly drained land to the north. This hilltop location apparently was a favorite of the Prairie's settlers.

Unimproved farm roads connect the two farmsteads with the adjacent county roads, which are metalled and passable in all weathers. Since the deep black clay is very tenacious when wet, the nearness of the two roads to the farmsteads is a distinct convenience.

The plan of the pastures and cropland appears to have been influenced both by the character of the land and by the methods of cultivation. The cultivated fields have been laid off primarily with reference to the location of arable land, then divided into convenient units. Unlike the Hill Country and the Divide, where the cropland is tightly fenced off from the encompassing range, this Prairie farm leaves its fields unfenced, with the exception of those adjoining the pasture and the few small plots which may be grazed. The flat creek bottom and its slopes are used for pasture, permanent pasture east of the road, and temporary pasture planted to oats and Sudan grass west of the road. There is also a corridor-like strip of permanent pasture stretching out from the western homestead in two directions.

Both the permanent and the temporary pastures are easily accessible to the large tanks which provide stock water. At the

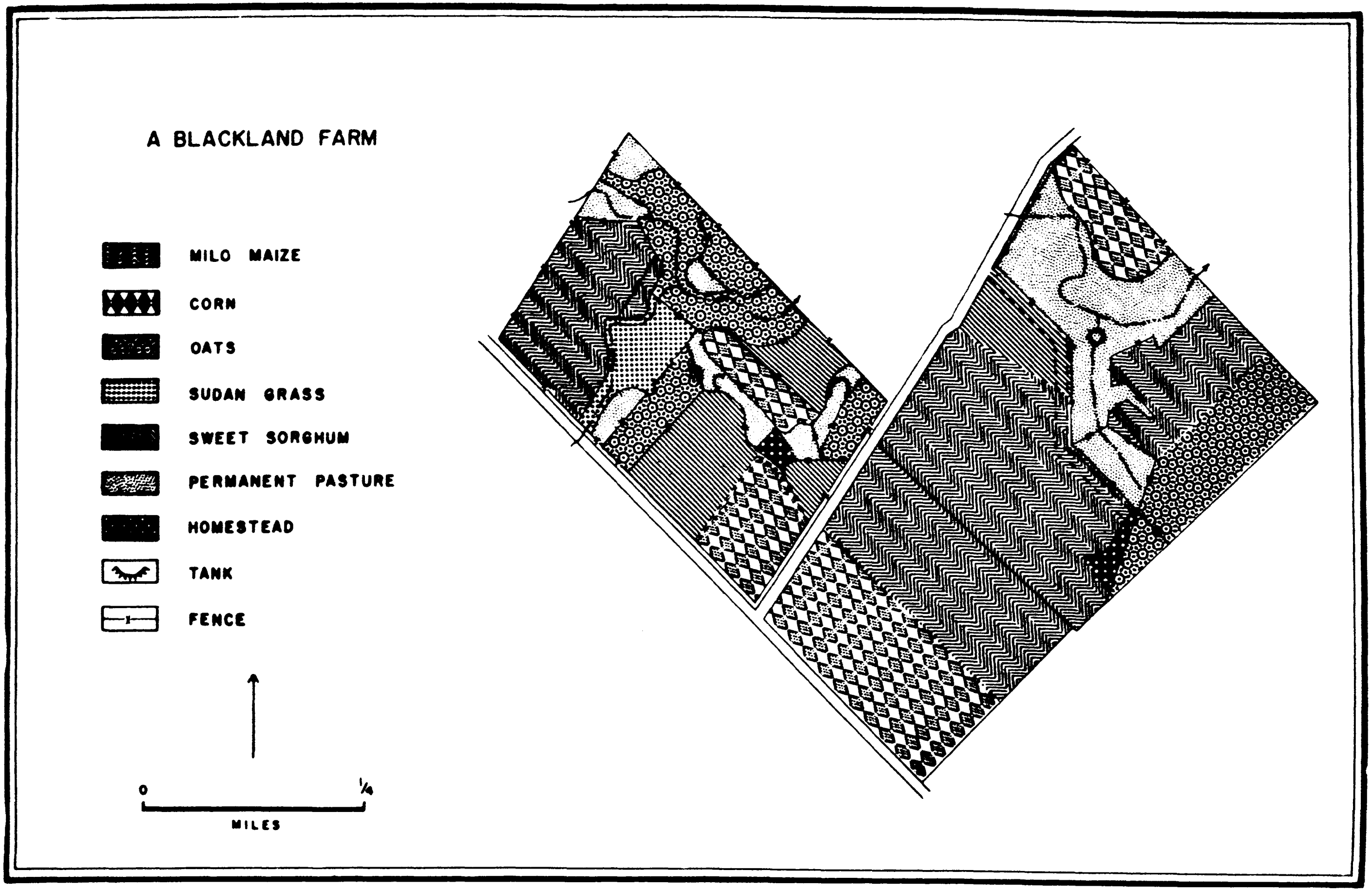
A BLACKLAND FARM
MILO MAIZE
CORN
OATS
SUDAN GRASS
SWEET SORGHUM
PERMANENT PASTURE
HOMESTEAD
TANK
FENCE
0
¼
MILES

Figure 19

homestead a cistern, also dependent on rainwater, supplies the house. Because of the heavy soil and the impervious bedrock[1] no dependable shallow water can be obtained. Deep wells in this area encounter sulphur water in the main aquifer.[2]

Crops.--On the deep black clay soil which mantles this farm, row crops occupy about two-thirds of the tilled acreage, with close growing fodder crops and small grain on the remainder (Fig. 19). With the exception of Sudan grass, which is grown for grazing, the rest of the crops are harvested. Oats and milo maize are combined in June and July respectively. Unlike corn, milo maize cannot be left in the field after it has matured. A week of cloudy, rainy weather is sufficient to cause not only the grains but even the stalk to sprout. Corn is left in the field until September and then harvested with a corn picker. The sweet sorghum is cut, left to dry on the field a few days, and then baled.

Because of the use of tractors and labor saving machinery, and of the diversified cropping program, the present crop association does not produce the labor peaks characteristic of cotton farming. The farmer hires one Mexican family the year round.

In the methods used, this farm is quite similar to the others on the Comal Prairie. No fertilizer has been applied to date, but the farmer plans to experiment with a complete fertilizer on a few acres this year. Although row crops are grown at present, as in the past, on rather steep slopes in the three large fields east of the road, two of the fields have been terraced. Also the farmer reports that the steeper slopes of the south field were grey, not black like the base of the slopes, when the field was first put into cultivation by his grandfather sixty-five years ago. It has lost ground under cultivation, however, and in a few places is down to the white subsoil. All three of the big fields are creased by an occasional shallow gully, which, however, is still crossable by the plow. As in most of the Prairie country, no specific rotation is followed. With one exception the fields will carry the same crops in 1948 as in 1947.

The present emphasis on feed crops is a recent development.

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[1] In George, Hastings, and Breeding, op. cit., see the geological map of Comal County following p. 142.

[2] Ibid., p. 46.

Formerly the Comal Prairie, like the rest of the Black Prairie, was cotton country. On this farm cotton occupied two-thirds of the cultivated acreage. The remainder supplied enough feed for the ten or fifteen horses and one or two cows which stocked the farm. There has been no cotton on the farm for about five years. The reason given by the farmer for abandoning it was low yield caused by the boll weevil, and by the depletion of the soil for the production of cotton. This trend has been apparent throughout the Comal Prairie.

Livestock.--Along with the shift from cotton to grain and from horses to tractors has come the increase in the numbers of other livestock. The farm now carries about thirty Hereford cattle, of which one is a bull, thirteen are cows, and the remainder calves. In May or June, when the stock are in best condition, their numbers will be reduced to about twenty-one by the sale of the ten-month to twelve-month old calves. As a sort of a sideline, the farm also carries twenty head of Rambouillet sheep. This is a breeding flock of fifteen ewes, three rams, and two lambs. The sheep are kept for their wool; therefore all the lambs are retained, and the sheep are sold at six or seven years, when their age begins to make them unprofitable. A further resource of the farm is a flock of about 175 chickens, kept primarily for the production of eggs.

None of the stock are fed, though they are grazed on the oats in winter and on the Sudan grass in summer. For the most part, however, they are supported on the farm's permanent pasture.

For home use the farm produces milk, eggs, and meat, the latter being stored in a locker.

Marketing and market centers.--The grain produced by the farm is sold rather than fed. Usually it goes to mills at New Braunfels or Seguin, a town in the next county to the southeast, but sometimes buyers come down from the Hill Country and truck it out.

Most of the calves are sold to the local butchers because the price is better, but sometimes the farmer trucks them tc the San Antonio Stock Yards. There also they are sold for slaughter rather than as feeder stock.

About half of the income produced by these sales comes from the stock and half from the crops.

The chief trading center for the farm is New Braunfels, both for the larger items such as agricultural machinery, and for the smaller day-to-day purchases.

All of the trading and market centers are accessible to the farm over broad, paved highways. With such short hauls involved, all the products move by truck, and the nearby railroad does not enter the picture.

Conclusions Concerning the Ranching and Farming Pattern

Although the countryside near New Braunfels was settled in 1845,[1] and parts of Kendall[2] and Kerr[3] counties in the 1840's and 1850's, the farming and ranching systems are still evolving in response to changing conditions, with corresponding changes in the crops, the stock, and the agricultural landscape. The shift from cotton to feed crops, in the Hill Country as well as on the Prairie, constitutes a fundamental change, since cotton was the dominant cash crop for many years. In a like fashion, the sale of lambs and the experimentation with various breeds of sheep for the production of heavier lambs and lower-shrinking fleeces are innovations which affect an important industry in the ranch country. However, these recent changes have not introduced strange products or new techniques, since all the species of stock and crops involved in the shift have been known in the area for decades.

An important factor in the changing land use is the advent of well-to-do outsiders who have purchased many ranches in the Hill Country to operate as a hobby or as an investment. Since these people generally do not get their living from the ranch property, they may in some cases ignore such problems as brush control, or they may carry their programs of improvements beyond the point where the returns would justify the outlay. A large percentage of the Guadalupe Hill Country is blocked up in ranches of this description. A survey by the tax assessor indicated that 16 per cent of the acreage of Kerr County was owned by nonresidents in 1945.[1] In Comal and Kendall counties, approximately one-third of the area was in the hands of outsiders in 1948 according to estimates of their respective tax assessors.[2]

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[1] A Twentieth Century History of Southwest Texas, Vol. I (New York: The Lewis Publishing Company, 1907), p. 134.

[2] "District Program for Kendall County Soil Conservation District, Texas," p. 1.

[3] M. M. Real, "A History of Kerr County, Texas" (Unpublished Master's thesis, University of Texas, 1942), p. 18.

Although the various changes discussed above, together with others of earlier date, have evolved the present systems of land use over the span of nearly a century, nevertheless there are evidences of maladjustment in both the Prairie and the Edwards Plateau. Recent maps of range condition classes drawn by the local Soil Conservation Service offices show a large percentage of the range in all three counties to be in poor condition. Overstocking is the root of the problem, and some idea of the extent of this practice may be gained from an examination of Table 11.

TABLE 11

CARRYING CAPACITY AND ANIMAL UNITS OF CATTLE, SHEEP, GOATS, HORSES, AND MULES IN THE GUADALUPE COUNTIES, 1945[a]

	Estimated Carrying Capacity in Animal Units	Animal Units Carried in 1945	Number of Animal Units Carried in Excess of Carrying Capacity
Comal County	30,341	32,544	2,203
Kendall County	32,400	43,865	11,465
Kerr County	64,533	90,829	26,296

[a] Carrying capacity for rangeland is figured as thirteen acres per animal unit, following Bonnen and Thibodeaux, op. cit., p. 72; carrying capacity for cropland, as four acres per animal unit, in accordance with the usage of the Soil Conservation Service. In designating the numbers of stock per animal unit, the usage of the Soil Conservation Service is followed, allowing one cow, five sheep, and five goats per animal unit, and counting horses and mules as 1 1/4 animal units. Data on acreages and livestock are from Census of Agriculture: 1945, Vol. I, Part 26, Texas.

The detrimental results include not only the spreading of brush, but also the necessity for buying feed. In 1944, a year with ten to twelve inches of precipitation above normal, from 84 to 93 per cent of the farms and ranches in the three counties purchased feed.

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[1] Information from Mr. Saenger, of the Kerrville Chamber of Commerce.

[2] Information from the county tax assessors of Comal and Kendall counties.

The outlay ranges from 16 to 29 per cent of the value of the livestock and livestock products sold or traded during that year.[1] Since this is not an area where stock is generally fed for the market, but typically an area which raises range stock, the purchase of large amounts of feed is not a good sign. Although some ranchers whose range is in good condition may find it profitable to provide a little supplemental feed at a critical season in order to increase the size of their calf crop, this is not the usual reason for feed purchases. All too often the feed is made necessary by the overstocking of the range, so that animals have to be carried four or five months of the year.[2] Where this condition prevails, the ranch is not in a position to take full advantage of its range for the production of stock on low-cost forage.

On the croplands as well as the range there are evidences of an unsatisfactory situation. The records for eight census years reveal low and variable crop yields throughout the three counties (Table 5). Much of the variability correlates with rainfall fluctuations. For example, in Comal County 1909 and 1939 were years of low rainfall, while 1919 had the highest precipitation on record. The generally low yields characteristic of the Guadalupe Counties may be traced to a number of factors including moisture deficiency, the long period of cultivation during which very little fertilizer has been used, soil erosion, extensive damage by deer in the Edwards Plateau, and in some cases, probably a reduction of small grain yields through excessive grazing of the crop in its early stages.

A more difficult factor to evaluate is the effect of property size on ranch and farm prosperity. Though there is some difference of opinion, apparently part of the operating units in the Guadalupe Counties are too small for the satisfactory support of a family. According to one agricultural expert in the area, a one-family property having 600 to 700 acres of range and fifty to seventy-five acres of cropland would be a good economic unit, provided it had not been abused. In support of this estimate, observation on sample ranches showed that while a unit larger than the estimate generally gave evidence in its buildings and other permanent improvements of having prospered over a considerable period, a unit smaller than the estimate appeared to be in the early stages of a program of improvements and purchase of equipment, as though it were enjoying an unaccustomed state of prosperity. In the Black Prairie, farms of around one hundred acres can support a family satisfactorily.[1] Nevertheless, size alone is not the criterion of success. The quality of the cropland and the condition of the range have much to do with the productive capacity of the unit, as does skill in management. Under more intensive methods some small places yield a higher income than some larger ones.[2]

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[1] Percentages computed from data in Census of Agriculture: 1945, Vol. I, Part 26, Texas, pp. 27, 44, 277, 294.

[2] Information from local agricultural authorities.

Although the land resource does not appear to be all that could be desired, and certain of the farms and ranches show deficiencies as operating units, nevertheless the region as a whole displays signs of moderate prosperity. The statistical evidence includes a low percentage of the population on relief according to census reports for 1930, 1937, and 1940,[3] the percentages for the counties being lower than for Texas as a whole. Further indications are the high proportions of farms and ranches which are owner operated. Though only 50 per cent of the agricultural units in Texas were operated by their owners in 1940, the proportions ranged from 70 to 76 per cent in the Guadalupe Counties.[4] The portions of the owner-operated units which were mortgaged were approximately the same for the Guadalupe Counties as for Texas, but the ratio of debt to value was a little lower for the counties than for the state.[1] These indications are borne out by the Department of Agriculture's rural level of living indexes. In 1945 all three counties exceeded the average level of living for Texas, for the West South Central Region, and for the United States.[2] With reference to the counties of the United States, Comal County is in the middle fifth, Kendall County in the second highest fifth, and Kerr County in the highest fifth.[3]

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[1] See analyses of investment, expenses, and income on 100 acre farms in L. P. Gabbard, J. B. Hutson, and T. L. Gaston, Jr., Systems of Farming for the Black Waxy Prairie Belt of Texas, Agricultural Experiment Station Bulletin No. 395 (College Station: Agricultural and Mechanical College of Texas, 1929), p. 30.

[2] Information from agricultural experts in the three counties.

[3] Fifteenth Census of the United States: 1930. Unemployment, Vol. I, pp. 993, 995; U.S. Office of Administrator of the Census of Partial Employment, Unemployment and Occupations, Census of Partial Employment, Unemployment and Occupations: 1937, Vol. III (Washington: Government Printing Office, 1938), pp. 469, 471, 477; Sixteenth Census of the United States: 1940. Population, Vol. II, Part 6, pp. 784, 863, 874.

[4] Percentages computed from data in the Sixteenth Census of the United States: 1940. Agriculture, Second Series, Texas, pp. 16, 20, 27, 28.

In evaluating these evidences, both favorable and unfavorable, of the quality of the occupance certain abnormal conditions should be taken into account. The photographs, taken during the winter of 1947-48, show a poorer than average condition of the range and the winter grains because much of the area had experienced a drought. Although at Kerrville the 1947 precipitation was near the average, that at Boerne was twelve inches below.

Longer in duration and more complex in its effects has been the existing boom condition. One aspect has been the high prices which agricultural products have brought. At the San Antonio Stock Yards during the year 1947 prices were high for all types of livestock, but those for cattle and lambs reached all-time peaks.[4] In addition, feed crops sold at a high level and wool was enjoying a price guarantee from the Commodity Credit Corporation. Although sales slacked off during the latter part of the year, mohair had brought good prices earlier.[5]

Concomitant with the high farm prices has been an increase in land values. Though the price rise for the Black Prairie has been slow in comparison with other regions in Texas, the eastern

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[1] *Ibid.*

[2] The farm operator level of living indexes for 1945 were:

United States	100
West South Central Region	81
Texas	101
Comal County	116
Kendall County	124
Kerr County	144

M. J. Hagood, "Farm Operator Family Level of Living Indexes for Counties of the United States, 1940 and 1945" (Washington: Bureau of Agricultural Economics, 1947), pp. 1, 2, 33, 34.

[3] *Ibid.*, p. 3.

[4] Information from Mr. Ellison, Marketing Specialist of the Production and Marketing Administration at San Antonio.

[5] Information from local wool and mohair warehouses.

Edwards Plateau has experienced a particularly high rate of increase.[1] Although the study made by the Texas Agricultural Experiment Station indicated that the 1945 values in the latter region were the highest in twenty-six years,[2] the prices for which rangeland was selling in the Guadalupe Counties at the end of 1947 had apparently exceeded even the 1945 figures.[3] Ranchers and business people both expressed doubt that a person intending to get his living from a ranch could afford such inflated values as these.

Other aspects of the present inflation have not worked to the farmer's and rancher's advantage. These include the high costs of labor, construction materials, and equipment. The retarding effect of these high prices on the installation of improvements and the purchase of equipment is the more felt that it follows on the heels of shortages in many of these items.

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[1] J. R. Motheral, J. H. Southern, and S. L. Crockett, The Price of Texas Farm and Ranch Lands, 1920-1945, Texas Agricultural Experiment Station Bulletin No. 688 (College Station: Agricultural and Mechanical College of Texas, 1947), p. 11.

[2] Ibid., p. 10.

[3] Information from local authorities.

CHAPTER III

RESORT PATTERN

Resort development in the Guadalupe Counties has produced a pattern in which the facilities, though varied in type, show a high degree of concentration (Fig. 20). The great majority are in the vicinity of Kerrville and in the canyon and cedar brake country along the roads which follow the three headwater streams of the Guadalupe to a distance of some fifteen miles west of Kerrville. The remainder of the resort establishments are clustered in the towns, strung along the main highways, or widely scattered through the Hill Country. In these latter cases also, rivers exert an important attraction.

There is a considerable variety of resort types in the Guadalupe Counties. Some, like the tourist courts and hotels generally provide only lodgings, while others such as young people's camps and guest ranches emphasize amusement facilities as their primary attractions. Similarly, in the two church encampments the lodging facilities are secondary to the educational conferences. Amusement facilities are less numerous and include such items as golf courses, swimming pools, the grounds of a state park, a race track, and a drive-in-theater. Quite different in function are the five hospitals and sanitariums which establish the reputation of the Kerrville area as a health resort. Finally there are the many private cabins and summer homes, which, by their localization, emphasize the concentration of facilities in the canyons above Kerrville. These privately owned camps range in quality from simple frame cabins to fine brick and stone houses in landscaped grounds. The latter type is particularly common along the Guadalupe upstream from Ingram and Hunt. In some cases the grounds consist of an acre or so, usually with a water front, but in others the house actually forms the headquarters of an operating ranch, which may be 3,000 acres or more in extent. The ranch type, however, is much more widespread in its distribution than the regular summer home, being found on the Divide and throughout the Hill Country. The small cabins are encountered

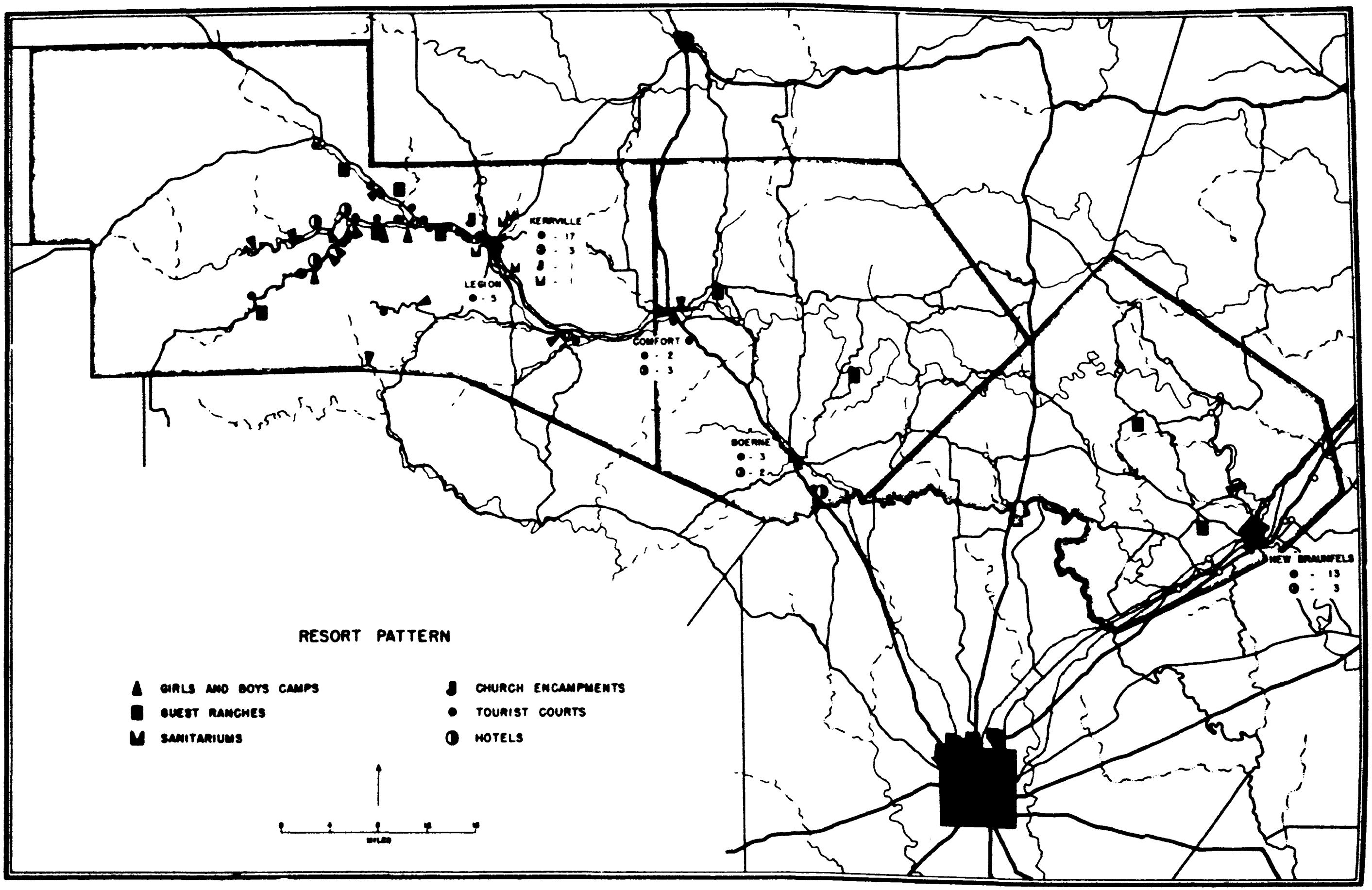
KERRVILLE
● - 17
◐ - 3
J - 1
M - 1
LEGION
● - 5
COMFORT
● - 2
◐ - 3
BOERNE
● - 3
◐ - 2
NEW BRAUNFELS
● - 13
◐ - 3
RESORT PATTERN
▲ GIRLS AND BOYS CAMPS
■ GUEST RANCHES
M SANITARIUMS
J CHURCH ENCAMPMENTS
● TOURIST COURTS
◐ HOTELS
0
4
8
12
16
MILES

Figure 20

not only among the other resorts of the upper forks, but show a secondary concentration along a four and a half mile stretch of the lower canyon which the Guadalupe has cut just upstream from the Balcones Escarpment.

In order to understand the attractions which drew these resort developments to the Guadalupe Counties, it is necessary to consider the regions from which the tourists come, for not only the contrasts between the Guadalupe Hill Country and the tourists' home areas, but also those between the Hill Country and other resort regions would figure in the drawing power of the Guadalupe resorts. To obtain a systematic check on the place of origin of visitors, reference was made to the records which the management of the Blue Bonnet Hotel in Kerrville courteously made available. The Blue Bonnet Hotel was selected because it has not only summer vacationers, but in addition parents of boys and girls in the summer camps, families visiting patients in the hospitals, hunters in the fall, and visitors from the north in the winter. Thus it represents to some degree most of the variety characteristic of the local resort development. A disadvantage is the presence of commercial travelers among the registrants. Since the complete year's record was not available, the months of July and December, 1947, were selected for tabulation. July, with August, represents the year's peak business, while December is the last month of the hunting season, though it does not get as many visitors from the north as January or February.[1]

From an examination of Table 12 it is immediately apparent that the Guadalupe Counties constitute a summer resort for Texas people. July has more than two and a half times as many registrations as December. And, in July, out-of-state registrations form the smallest category except for that from the Edwards Plateau itself. Since the Edwards Plateau registrations for July are practically the same in number as those for December, probably they do not represent tourist visits, but rather the regular trips for shopping, business, or amusement which people usually make to their trading centers. The dominance of the Kerr County towns among the addresses of these Edwards Plateau registrants seems to bear out this interpretation. Among the July out-of-state registrations there are a few from places as distant as the eastern and western borders of the country, and one from outside the United States, but the greatest numbers are from the neighboring states of Louisiana and Oklahoma.

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[1] Information from Mr. Harris, the manager of the Blue Bonnet Hotel.

TABLE 12

NUMBER OF REGISTRATIONS AT THE BLUE BONNET HOTEL BY AREAS[a]

Area	July	Dec.
Texas Gulf area...............................	1,103	251
Eastern plains border of Edwards Plateau....	569	274
North Texas.................................	817	282
Edwards Plateau.............................	150	154
Areas outside of Texas......................	171	103
Total...................................	2,810	1,064

[a] These figures were tabulated from the records made available through the courtesy of the Blue Bonnet Hotel in Kerrville.

TABLE 13

NUMBER OF REGISTRATIONS AT THE BLUE BONNET HOTEL BY TOWNS[a]

Town	July	Dec.
Houston.....................................	416	72
San Antonio.................................	393	277
Dallas......................................	148	72
Austin......................................	139	71
Fort Worth..................................	108	17
Corpus Christi..............................	103	18

[a] These figures were tabulated from the records made available through the courtesy of the Blue Bonnet Hotel in Kerrville. All towns with 100 or more registrants are included.

Among the Texas registrants, those from the Texas Gulf region[1] clearly dominate the summer business, supplying nearly

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[1] The area referred to as the Texas Gulf region is a belt stretching inland from the coast approximately 130 to 160 miles in most places, but reaching an extreme width of about 230 miles in the Rio Grande Plain.

40 per cent of the July registrations. Not as many come from North Texas,[1] though the contrast between the July and December registrations leaves no doubt that vacationers represent a notable fraction of the summer visitors. The large number from the plain along the east border of the plateau[2] is made up chiefly of visitors from San Antonio and Austin (compare Tables 12 and 13). Again the contrast between registrations in the winter and summer months suggests that the July figures represent a large proportion of tourists.

The table giving registrations by towns shows more than the fact that, relatively speaking, large numbers are to be expected from large cities. Though Houston, San Antonio, and Dallas are of similar size, the number registered from Dallas more nearly resembles that from Austin, a smaller but nearer city. This suggests the importance of proximity. However Houston, which is nearly as distant as Dallas, sends a few more visitors in summer than San Antonio, a city on the borders of the area. The contrast between the July and December registrations from Houston also emphasizes the strong attraction of the Guadalupe resorts for Houston people in the summer. On the other hand, San Antonio's large registration is in part made up of business travelers, one group in particular working out from San Antonio and arriving at Kerrville on Monday nights with considerable regularity.[3]

The relatively small total registrations in December, and that of out-of-state visitors in December both suggest that the winter resort function is not well developed. Sixty-four of the 103 December out-of-state registrants came from the Middle West and the Northeast. This is nearly twice as great a number as the July registrations from the same two areas. However, if all are assumed to be tourists rather than business travelers, their numbers are still very small in comparison with tourist registrations in July.

Other evidence of the source and season of the resort business was gathered in interviews with managers of resorts and business people. Throughout the Hill Country, the residents, when asked the source of the tourists, were practically unanimous in naming Houston first, then the Gulf Coast, and finally the Rio Grande Valley. The main resort season is June, July, and August. Because of the accommodations usually provided for hunters on the ranches where they lease hunting privileges, the November and December registrations from this source do not appear to be a major item in the hotel and tourist court business, but merely an acceptable extra. The hunters like the other vacationers come largely from Texas.

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[1] The term North Texas is applied to the area north of the Texas Gulf region and the Edwards Plateau.

[2] The eastern plains border of the Edwards Plateau is a narrow strip of land most of which is included in the counties that extend from the Plateau onto the plains below the Balcones Escarpment.

[3] Information from Mr. Harris, manager of the Blue Bonnet Hotel.

The attractions of the Guadalupe Hill Country which draw the vacationers and consequently the resort developers include both physical and economic conditions.

In the great expanse of the Texas plains, the eastern Edwards Plateau forms a notable contrast. Although neither the altitude nor the relief is very great, the variety and small scale of the landscape features give them remarkable beauty and picturesqueness. A strip of level terrace fifty yards to a mile or so in width forms an admirable foil for a hundred-foot limestone cliff topped by dark green junipers, or even for a wooded hillside rising steeply from the fields. The rivers, though not impressive in width, are a joy to the plains dweller because of the contrast between their clear waters and rocky beds and the muddy banks and streams to which he is accustomed. Through the Hill Country the course of the Guadalupe forms a succession of wide, rippling shallows over limestone ledges, irregular descents through gravel and cobble stretches, and deep, still pools (Fig. 4). The latter are the natural swimming holes of many resorts. The former give variety to the drives which wind up the canyons, crossing and recrossing the streams on low-water bridges.

Since the elevation ranges from about 700 to 1,500 feet in the eastern Hill Country and from about 1,630 to 2,200 feet in the west, the summer climate is not cool. Neither is the heat excessive, for the mean maximum temperatures remain in the low nineties (Table 14), and, on the average, only one to four days in a month reach 100 degrees Fahrenheit.[1] Furthermore, the nights

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[1] At Kerrville the average number of days with temperatures 100 degrees Fahrenheit or over during the ten years 1937 through 1946 was: June, 1.0; July, 2.8; and August, 4.1. These figures were computed from _Climatological Data for the United States by Sections_, Vols. XXIII-XXXIII, Nos. 6, 7, 8.

TABLE 14

AVERAGE SUMMER AND WINTER MAXIMUM AND MINIMUM TEMPERATURES IN DEGREES FAHRENHEIT FOR KERRVILLE[a]

Month	Av. Max.	Av. Min.
Dec.	61	36
Jan.	62	32
Feb.	65	37
June	90	66
July	93	68
Aug.	94	68

[a] Compiled from Climatic Summary of the United States, sec. 33, p. 33-33.

are fairly cool, their minima averaging in the sixties and rarely reaching 75 degrees.[1] Not the temperature, however, but the lower relative humidity constitutes the major climatic attraction of the Hill Country for the residents of the coast (Table 15). Although a difference of 5 to 9 per cent between the noon relative humidity readings of Houston and San Antonio does not seem great, the contrast in the sensible temperatures of the coast and the Hill Country is one of the most vivid impressions of a visitor to the two areas.

TABLE 15

AVERAGE PERCENTAGE OF RELATIVE HUMIDITY AT NOON, LOCAL TIME, FOR SUMMER MONTHS[a]

Month	Houston	San Antonio
June	60	55
July	57	50
Aug.	54	46

[a] In the absence of relative humidity records for the Guadalupe Counties, those for San Antonio were used. The noon reading was selected because humidity is most oppressive during the heat of the day. The figures were compiled from Climatic Summary of the United States, sec. 33, pp. 33-4, 33-6.

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[1] Ibid.

For winter resort development also the climate is an equivocal factor (Table 14). During sunny spells, the temperatures and the weather in general are very pleasant for out-of-doors amusements, but when the cloudy, rainy spells set in, especially if temperatures drop to the forties, the rawness is quite disagreeable. Often the region has one or two of these rainy spells in a month, and sometimes they last a week or longer.[1] This variability is a disadvantage in the eyes of northerners who travel long distances seeking a maximum of contrast in temperature and sunshine. Some indication of the difference between the eastern Edwards Plateau and rival areas farther west is given by Table 16, showing percentage of possible sunshine at San Antonio and Phoenix.

TABLE 16

PERCENTAGE OF POSSIBLE WINTER SUNSHINE AT SAN ANTONIO AND PHOENIX[a]

Month	San Antonio	Phoenix
December	49	72
January	51	75
February	53	79

[a] In the absence of sunshine records for the Guadalupe Counties, those for San Antonio were used. The figures were compiled from Climatic Summary of the United States, secs. 26, 33, pp. 26-2, 33-6.

In addition to landscape and weather conditions, distance is a major factor in the resort development. Lacking the spectacular scenery and climate of such places as the Rocky Mountains, the southern Florida beaches, or the Arizona deserts, the Hill Country does not draw great numbers of tourists from distant parts of the country, but rather serves the Texas area, particularly the Texas Gulf region, during the season when it most needs relief. For the plains that border the Hill Country, greater proximity probably means more frequent visits. According to local reports, the San Antonians not only come up for Sunday drives in summer, but find the fall colors of the deciduous trees very attractive in the autumn.

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[1] *Ibid.*

For naturalists and hunters the native vegetation and animal life of the region have a special fascination. The abundance and variety of these forms, together with the mingling of eastern and western types, have been sufficient to draw to the Kerrville area a camp administered by the National Audubon Society. The hunters, however, are most interested in the white-tailed deer and the wild turkeys of the area. According to the Texas Game, Fish and Oyster Commission, about 90 per cent of the turkey hunting in Texas is done in the Edwards Plateau, and the greatest concentration of turkeys is in Kerr County.[1] Here the shelter and the mast afforded by the brushy cover are very favorable for turkeys, while the water supply provided by ranches on the Divide has increased the numbers in that area. However, overgrazing has a serious effect on the turkey population, and competition from sheep and goats means a food shortage on many ranges in January and December. White-tailed deer also reach their maximum numbers in the thickets of the Edwards Plateau. It has been estimated that 70 per cent of the deer killed in Texas are taken in this area. Like the turkeys, however, the deer suffer from the overgrazed pastures and the competition of domestic stock. These conditions result not only in a reduction in the size of the deer, but in a considerable loss by starvation during bad seasons. Nevertheless, the owners' income from hunters is estimated to be more important in the Edwards Plateau than in any other part of Texas.

In addition to its natural attractions, the Hill Country, especially the upper forks of the Guadalupe, has the great advantage of being a going concern in the resort business. All the advertising done by an individual resort adds to the reputation of the area as a whole, and the momentum acquired during several decades of development is at the disposal of a new establishment.

The Gross Resort Pattern

The broad features of the gross resort pattern were sketched at the beginning of the chapter, but an examination of the localization of specific types of resorts adds to the understanding of the resort industry in the Guadalupe Counties.

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[1] The following information on the scope and conditions of the hunting industry in the Edwards Plateau was derived from Principal Game Birds and Mammals of Texas, Their Distribution and Management (Austin: Texas Game, Fish and Oyster Commission, 1945), pp. 8-29, 92-100.

Tourist courts[1] are both the most numerous and the most widespread of the resort facilities. In general, highways, streams, and towns seem to be the chief factors in their location. In Kerrville all three attractions are combined along the street which follows the Guadalupe and joins the highway at the edges of town, but in New Braunfels the main highway course and the streams diverge. There some tourist camps follow the highway and some the rivers, but all those of Comal County are in the immediate vicinity of New Braunfels. In Kendall County the courts are in Comfort and Boerne, and along the federal highway, one of the latter group being about five miles from Comfort, with its cafes and other shops. Kerr County has about three times as many tourist courts as Comal and about four times as many as Kendall. All of these except the one at Center Point are in the vicinity of Kerrville and in the Hill Country to the west. Legion, which stands at the gates of the Veterans hospital, has five courts strung along the highway which forms its main street. Kerrville has seventeen tourist courts, and the remaining fourteen are along the streams at varying distances from the stores, cafes, and post offices of the towns. In general, many of the tourist courts found along the highways and some in the towns do not have particularly attractive sites, but are in position to share the transient trade as well as the vacationers' business. Others far up the headwaters of the Guadalupe or its tributaries obviously depend on vacationers, sacrificing a position in full view of the main traffic flow for beauty of site.

Most of the Guadalupe Counties' hotels are in the main towns and serve transients as well as tourists. However, four of the fifteen are in rural areas, and three have attractive sites up the Guadalupe forks. The oldest of the latter group, the Heart o' the Hills, was built originally to accommodate parents with children in the nearby camps.[2] Cabins have been added beside the original structure, and, like the main hotel, are set close to the base of a limestone cliff, with a large pool of the Guadalupe a short distance away across a narrow strip of terrace land. The

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[1] Groups of small, furnished cottages were classes with the tourist courts, many of which also have kitchen facilities.

[2] Information from Mrs. Jones, of the Heart o' the Hills.

River Bend Lodge, of more recent construction, has a similar site and also was designed primarily for housing the parents of youngsters at camp. The third hotel is at the edge of Hunt, standing on top of a steep slope with a view over the valley of the north fork. The fourth is on the federal highway south of Boerne.

Trailer parks in the Guadalupe Counties are few and relatively small. On odd lots in town and on open spaces at the fringes of Hunt, Ingram, Kerrville, and New Braunfels six trailer parks are found. One of the more attractive parks in Kerrville had an average of about fifteen to thirty trailers at a time.[1]

One of the most concentrated of all the resort types is the hospital group.[2] With the exception of a private sanitarium in Kerrville, these facilities all cluster in the immediate vicinity of the town, at the edge of, or just beyond the built-up area. The largest is the Veterans hospital, south of Kerrville. It stands on a prominent ridge beside the highway and the railroad, with the low brick buildings of the original units almost out of sight among the trees, while the recently finished block, which has a capacity as great as all the older buildings, towers above them. To a certain extent the hospital forms a small, independent community, with its own utilities, post office, and bus service, and with living quarters for some of the staff.[3] Since it has facilities for about 800 patients, and a staff of about 400, the Veterans hospital is a notable factor in the settlement pattern and employment structure of the vicinity. In addition it draws numbers of visitors and of prospective patients awaiting admittance, who are housed at Legion and Kerrville. The area which it serves is nationwide. Unlike the other sanitariums, Veterans no longer takes tuberculosis cases alone, but has about a quarter of its space available for the treatment of other ailments. The Kerrville State Sanatorium has been a negro tuberculosis hospital with a capacity of about 185 beds,[4] but is to be transformed into a hospital for spastic children. The building stands on a bluff above the Guadalupe looking across the valley toward Kerrville. The other three sanitariums are privately owned and operated, and have a combined capacity of approximately seventy beds.[1] One is in Kerrville and the other two are north of town on the slope overlooking the Quinlan Creek valley. One has a rather bare, sunny site, but the other stands in a grove of trees.

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[1] Information from the manager of the trailer park.

[2] Hospitals built for the local communities are not included in the resort pattern, but are discussed in chap. iv.

[3] Information on the hospital was obtained from Mr. Via, of the Veterans Administration Facility.

[4] Texas Almanac and State Industrial Guide, 1945-1946, p. 395.

The two church encampments are similar in being near Kerrville, but unlike in site. The Westminster Encampment, belonging to the Presbyterian Synod of Texas, was originally a little distance away from Kerrville, though accessible to its facilities.[2] Since 1906, however, the town has grown out to the borders of Westminster, and the city limits have been expanded to include it. The site of the encampment is partly on the Guadalupe terrace and partly in the small valley cut by Quinlan Creek. Although the grounds extend to the Guadalupe, the river is seldom used for swimming at present. The settling of the Guadalupe valley, together with the great changes made in the stream's course by the 1932 flood render it unattractive for swimming. The facilities of the encampment include an assembly building and a number of frame lodges owned by the Synod, in addition to the lodges which are privately owned. Statewide conferences in summer bring as many as 200 or 400 people to the camp and its vicinity, but the number of vacationers who stay longer periods averages about 150 at one time. The Methodist Kerrville Assembly, more recently established, is still beyond the margin of Kerrville. Unlike Westminster it stands on top of a steep, rocky hill with about a mile and a half of terrace stretching between the assembly and the river. Though it maintained a swimming place on the Guadalupe, it also has found the use of the Kerrville swimming pool more satisfactory in recent years.[3] The assembly's facilities include a tabernacle, a dining hall, and buildings to house the faculty and others. In addition there are about fifty privately owned houses of substantial frame or rock construction. The assembly serves the West Texas Conference rather than the state as a whole, and draws from 200 to 400 people to its special conferences.

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[1] Information from Mr. Saenger, of the chamber of commerce.

[2] Information from Mrs. McCutchen, of Kerrville.

[3] Information from Miss Marberry, of Kerrville.

The guest ranches of the Guadalupe Counties are not as numerous as the young people's camps, the other style of resort which specializes in recreation programs. Kerr County has four guest ranches, Comal, two, and Kendall, one. However Kendall County also contains a private adult camp maintained by the Shriners. In Kerr County, the guest ranches are in the well developed resort country of the upper Guadalupe, but do not all have river frontage. In Kendall County, the Shriners' camp is on high ground in a meander of the Guadalupe with undeveloped Hill Country all around it, and the nearest town some miles away. The guest ranch lies in the wide valley of a small tributary half a mile from the Guadalupe. In Comal County both the guest ranches are in the Hill Country away from the rivers. In general, the guest ranches of the Guadalupe Country emphasize the family style of entertainment and accommodate fifteen to thirty people at a time.[1] Rustic decorations with modern conveniences are characteristic of the buildings, some of which are bunkhouses with several rooms, and some, individual cottages. All establishments capitalize on their ranch environment in emphasizing horseback riding. In addition, swimming, either in the river or in artificial pools, badminton, soft ball, and other games are promoted as well as square dances, barbecues, and picnics.

Perhaps the most characteristic resort type in the Guadalupe Counties is the young people's camp. Although there are four times as many tourist courts, the latter do not distinguish the Guadalupe Counties from other resort areas in the state, while the concentration of boys' and girls' camps is widely known in Texas. Thirteen of the fifteen young people's camps in the Guadalupe Country are in Kerr County, and ten of these are in the headwaters area of the Guadalupe. Kendall and Comal counties have one camp each, located on the Guadalupe. The majority of the camps accommodate 100 or more during one term, but a few have maximum capacities of 200 to 300.[2] Two are definitely luxury camps with elaborate stone buildings, but the majority have simple frame cabins constructed to let in as much breeze as possible.

Because the girls' and boys' camps are such a distinctive feature of the Guadalupe Counties' resort development, one of these was chosen as the sample to illustrate the functioning of a resort establishment, and the association of its physical plant with the natural site features.

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[1] Information from the managers of the various ranches.

[2] Information from the managers of the various boys' and girls' camps.

A Guadalupe Camp

The site of the Guadalupe camp is a strip of terrace cut by the Guadalupe River, and rimmed by steep limestone hills which are covered with a dense growth of cedar and oak. The spot was chosen because of the large natural pool formed by the Guadalupe, and the picturesque limestone bluff which rises from its borders.[1] Upstream there are two smaller pools suitable for the weaker swimmers (Fig. 21). The smooth open stretches of the terrace are used for playing fields, while the tree-covered section shades the mess hall, gym, and other activities buildings. The cabins of the junior and senior camps, however, have been placed among the trees on the base of the bordering hill slopes. Formerly the cabins stood along the river with the other buildings, and the road also followed the terrace near the river. After the sudden descent of the 1932 flood, however, both the road and the sleeping quarters were moved back from the stream. This arrangement is characteristic of the majority of the camps along the Guadalupe. Although the river course is probably the chief site attraction, the cabins are generally set at the inner margin of the terrace or on the base of the adjacent slope.

The terrace, with the camp headquarters, is framed on either side by the rough, wooded pastures of the 3,000 acre ranch to which it belongs. Near the camp to the north such facilities as the infirmary, the living quarters for counselors' families, and the stables occupy the slopes, while east of the river, two large springs in a deep ravine have been sealed and tapped for the camp water supply. The farther reaches of the ranch are also used for hikes and rides, twenty miles of bulldozed roads being maintained for these purposes.

In addition to the lodging and recreation facilities provided by the physical plant, a considerable part of the food

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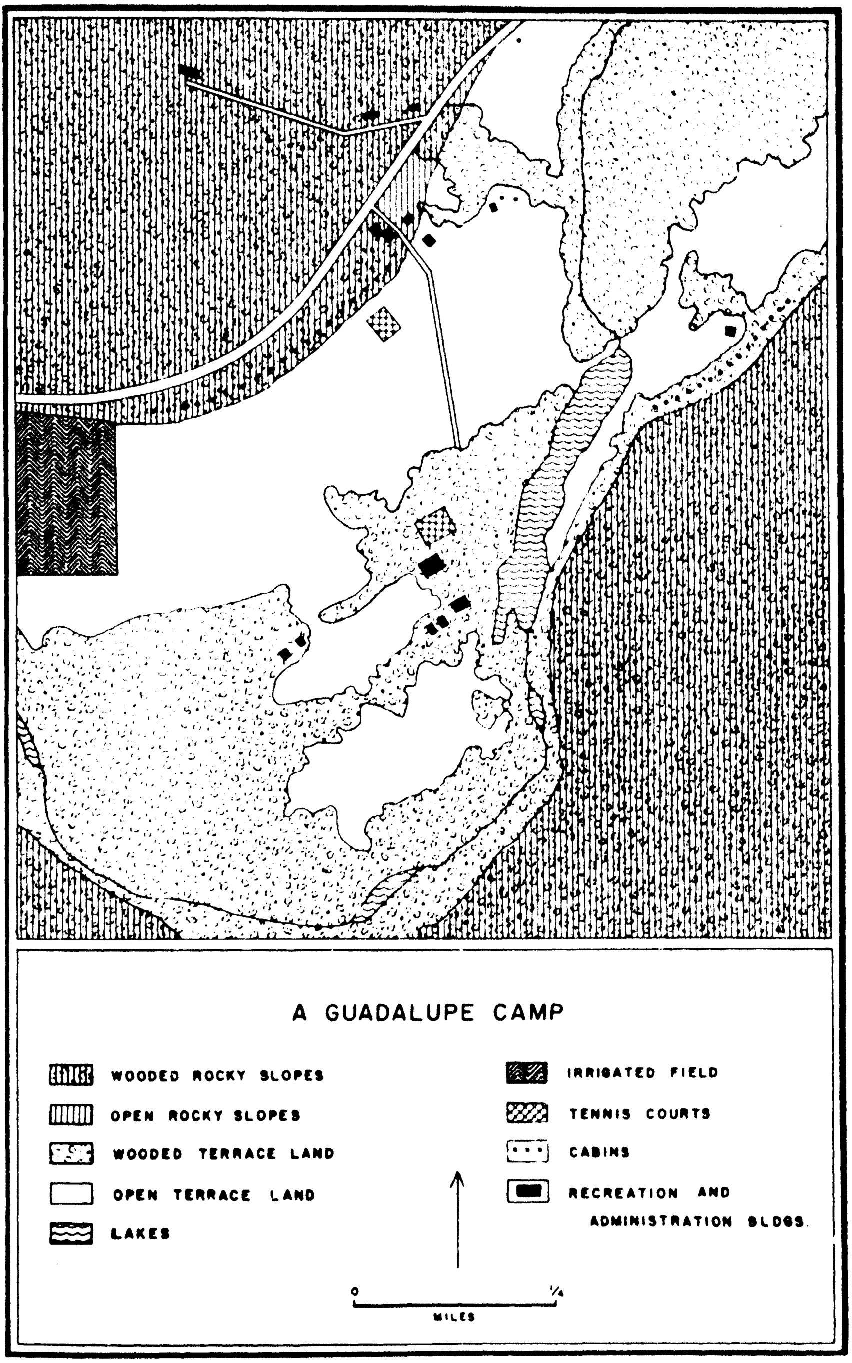
[1] Information for this description of the camp was obtained from Mr. Hutchings, the business manager, from field observations, and from an examination of the aerial photograph of the ranch provided by the Kerrville office of the Soil Conservation Service.


A GUADALUPE CAMP
WOODED ROCKY SLOPES
OPEN ROCKY SLOPES
WOODED TERRACE LAND
OPEN TERRACE LAND
LAKES
IRRIGATED FIELD
TENNIS COURTS
CABINS
RECREATION AND ADMINISTRATION BLDGS.
0
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MILES

Figure 21

supply is also produced on the place. During the summer thirty-six cows are milked in a "Grade A" dairy, and a sixteen-acre garden, bounded by a deer-proof fence, is irrigated from the Guadalupe for the cultivation of fresh vegetables. The remainder of the produce needed is bought in Hunt, while canned goods and other such items come from Kerrville.

Like the other Guadalupe resorts, this camp draws boys from Texas chiefly, but has a few from Louisiana, Oklahoma, and Arkansas. Its violently fluctuating seasonal population is also suggestive of the general conditions up the Guadalupe forks. In summer about 375 people congregate on the ranch, while only eighteen remain through the off season. The Guadalupe camp, like most of the others in the vicinity, maintains two summer terms, each of six weeks duration. The opening and closing dates of the camps, together with the Fourth of July, which is celebrated by special programs, constitute the major local crises in the provision of lodgings for visitors. Although the camps have tried to stagger their opening and closing dates, last year saw some occasions on which parents occupied tents because of the absence of other accommodations.

Conclusions Concerning the Resort Pattern

An attempt to evaluate the scope of the resort industry is limited by the absence of census data on the number of tourists which visit the Guadalupe Counties and on the income from the business they bring. Even the occupation figures of the census of population, taken in the spring, give an inadequate representation of the employment provided by the resort establishments and related services of a summer resort. As a consequence, field evidence is relied on to a considerable extent.

Field indications of the scope of the resort industry include both information obtained from residents of the area and evidence from direct observation. One of the most convincing proofs of the magnitude of the industry is the array of resort establishments specialized for the service of tourists. Without including such amusement facilities as the drive-in-theaters, bowling alleys, and other enterprises which probably have a good deal of local business in addition to the tourists they attract, a roster of at least 110 resort establishments was compiled. In addition there are the many privately owned cabins, summer homes, and ranches which accommodate large numbers of visitors.

Because the localization of the resort facilities is quite marked, and the information obtained from interviews applies to the counties individually rather than collectively, the scope of the industry and its importance in the support of the area can be handled best by considering the counties separately.

The concentration of the resort business in Kerr County has already been mentioned. Seventy-two of the 110 resorts which were identified in the Guadalupe Country are found in Kerr County. These indications of relatively intensive development are borne out by information furnished by the residents of the county. Half of the primary support both of Kerrville[1] and of Kerr County[2] is drawn from the resort business according to informed estimates, and the population of the county almost doubles in the summer season.[3] Individual shops such as grocery stores and variety stores register a 20 per cent to 30 per cent increase in business during the summer months. A further advantage to the county is the location of the heart of the resort country in the rough cedar brake area which probably forms the poorest range of any of the large sections of the county. The very steepness of slope and density of cedar and oak cover which are most objectionable in a pasture are most picturesque for a resort, especially where combined with the attractions of the streams. It is reported that cedar brake land with a water front has been selling for as much as five hundred dollars an acre. Many of the people who formerly struggled with the adverse range conditions of the area now find employment on the resorts and estates which have been established there.

A comparison of the occupational figures for Kerr, Kendall, and Comal counties suggests that the resort business plays a smaller role in the total support of the latter two.[4] A more emphatic indication of the lower intensity of their resort development is the low proportion of the specialized resort establishments found within their borders. Out of the total of 110, Kendall County has eighteen and Comal, twenty. However the two eastern counties may have a greater portion of the area's visitors than the number of establishments indicates because San Antonians driving in for the day would be more likely to patronize the eating places and amusement facilities used by the local people than the resorts which obviously serve outsiders. A major attraction for these people from nearby areas, in addition to the scenery of the Hill Country, is Landa Park in New Braunfels.[1]

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[1] Information from Mr. Saenger, of the chamber of commerce.

[2] Information from Mr. Lynch, of the Kerrville office of the Production and Marketing Administration.

[3] Information from Mr. Saenger, of the Kerrville Chamber of Commerce.

[4] People employed in the resort business--that is, hotels and lodging places, amusement, recreation and related services, and eating and drinking places--in March, 1940, as percentages of the total gainfully employed in the respective counties, were:
Comal, 2.6; Kendall, 4.7; Kerr, 6.1.
according to the Sixteenth Census of the United States: 1940. Population, Second Series, Texas, pp. 111, 122.

The degree to which the resort pattern functions adequately, like the other features of the resort industry, is not recorded in statistical sources and must be judged in the field. The general impression produced by the facilities is favorable. Though some of the tourist courts and camps are not very attractive in style or furnishings, the majority appear well kept, while some are handsomely designed and maintain pleasant grounds. These characteristics of construction and upkeep appear to be true of the other less numerous types of resorts also. To this indication of the quality of the occupance may be added the statements of both business people and resort managers that the accommodations are generally fully occupied during the summer months. A further confirmation is the two-week limit which the Blue Bonnet Hotel places on the period of stay in summer. One manager, however, did suggest that the relief from wartime travel restrictions, together with the opening of new resorts, had been somewhat felt in the summer of 1947. The construction of new facilities also indicates the optimistic attitude of the industry as a whole. In Kerr County, for example six tourist courts, one hotel, and one boys' camp were added to the roster in 1947.[2]

Although the resort industry is rather highly developed in some sections of the Guadalupe Country there is much scope for a more intensive use of the counties' tourist resources as far as the facilities and the area available for further building are concerned. Because the tourist business is concentrated to such a degree in the summer season, many of the facilities stand idle the remainder of the year. The resort operators are, of course, keenly aware of the detrimental effects of this condition, and hope to attract increasing numbers of winter visitors from the Middle West. However, they are handicapped by the lack of any unique climatic or scenic attractions to offset the disadvantage of distance. In the meanwhile, the resorts fill up the vacant months as well as they can. Guest ranches may accommodate hunters in the fall season, and take conventions and other organization meetings. Young people's camps sometimes remain open in the early fall for the practice sessions of high school football teams, while one of the hotels up the Guadalupe forks makes a special bid for honeymooners during the off season. Not the facilities alone but the land resource as well could easily accommodate further development if the necessary tourist business could be found to support the expansion. Along the Guadalupe, a number of rugged stretches with scenic attractions as great as those of the upper forks are still available, and even in the upper canyons, where resorts are most closely spaced, long stretches of river front still have no buildings. In the latter cases, however, field observation does not indicate whether or not the open stretches are already incorporated in such resort properties as camps or estates. Clearly the continued expansion of the resort industry in the Guadalupe Counties will be governed by their success in drawing greater numbers of tourists, rather than limited by the availability of suitable land. The existence of similar land types in the neighboring counties is a challenge to the Guadalupe Country's claim to the tourist business, but the established reputation of Kerrville and the upper forks, and of Comal Springs in Landa Park is an important asset.

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[1] See chap. iv for a discussion of Landa Park.

[2] Information from Mr. Saenger, of the Kerrville Chamber of Commerce.

CHAPTER IV

THE URBAN PATTERN

In a consideration of the functional patterns of the Guadalupe Counties with respect to their inherent features, their relations with the natural complex, and their interrelations with each other, the urban pattern is introduced last because of the degree to which its features are dependent on the pursuit patterns. The functions of the urban places which are keyed to the local ranches, farms, and resorts include their service (1) as supply centers, (2) as trading and shipping centers for ranch and farm products, (3) as amusement and service centers, (4) as processing centers, and (5) for the resort industry, as clearing houses for inquiries, a function assumed by their chambers of commerce. In addition, the towns themselves house some important resort establishments, though the drawing power of the latter is largely dependent on the attractions of the countryside. Urban functions which are essentially independent of the rural activities and resources comprise several of the processing establishments of New Braunfels.

The relative importance of the urban pattern among the functional patterns of the Guadalupe Counties is revealed not by the area it occupies, but by other forms of evidence. The proportion of the population living in incorporated towns ranges from 25 per cent to 57 per cent, averaging 48 per cent.[1] An even larger percentage of the labor force is employed in such town pursuits as trade, processing, and service. Comal ranks highest with 62 per cent; Kerr has 58 per cent; Kendall, 36 per cent.[2] More impressive still is the preponderance of urban pursuits in providing the determinable gross income of the counties. If the value of agricultural and manufactured products, the sales of the retail and wholesale stores, and the receipts of service establishments be totaled, the last four, corresponding to town pursuits, comprise 92 per cent of the total in Comal, 82 per cent in Kerr, and 68 per cent in Kendall.[1]

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[1] Computed from the Sixteenth Census of the United States: 1940. Population, Vol. I (Washington: Government Printing Office, 1942), pp. 1047, 1051.

[2] Computed from the U.S. Bureau of the Census, County Data Book (Washington: Government Printing Office, 1947), pp. 355, 367: and Sixteenth Census of the United States: 1940. Population, Second Series, Texas, pp. 110, 122.

The Gross Urban Pattern

Urbanization in the Guadalupe Counties takes the form of twenty-seven small towns and four larger centers. These urban places are spaced irregularly at intervals varying from one to thirteen miles (Fig. 8). Although the smaller towns are too diverse for generalized description, the four major centers have many features in common. Because they were built for the most part on level terraces, and the neighboring hills are wooded, the towns are not first seen as great units in the landscape. Rather they give warning of their proximity through the closer spacing of houses and commercial establishments along the highway approaches, and then envelope the newcomer in the details of white houses in shady yards, stereotyped filling stations on strategic corners, and clustered shops in business districts. From only a few vantage points can one of these towns be seen spread out like a map, with the features of its surroundings simplified by distance. A more leisurely drive through such a town reveals a central business district composed of low brick and stone stores, built flush in the two big towns, but blocked up less solidly in the two smaller ones. Stretching out from the business district along quiet, shady streets are the residence sections where white frame houses and cottages prevail. However, some of the older houses are of plain, buff-colored limestone blocks which were quarried in the vicinity, while a few recent ones are faced with irregular slabs of flagstone, also a local product. The generally well kept appearance of the towns is emphasized by the large proportion of the streets which are paved or otherwise hardsurfaced, and a comfortable air of stability results from the mingling of houses quite different in age but similar in their good state of repair.

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[1] Computed from the Sixteenth Census of the United States: 1940. Census of Business, Vol. I, Retail Trade: 1939, Part 3 (Washington: Government Printing Office, 1941), pp. 560, 562; Vol. II, Wholesale Trade (Washington: Government Printing Office, 1942), pp. 1008, 1010; Vol. III, Service Establishments, Places of Amusement, Hotels, Tourist Courts and Tourist Camps: 1931 (Washington: Government Printing Office, 1942), pp. 254, 256; and Sixteenth Census of the United States: 1940. Manufactures: 1939, Vol. III (Washington: Government Printing Office, 1942), pp. 982-983.

Not only the physiognomy of the towns but the range of their functions vary with their sizes. The following classification of settlements by size is based on certain functional distinctions which were observed; the estimated population figures are unsatisfactory in every case. For the three incorporated places, census figures are eight years old and subsequent growth has been too substantial to be ignored and the available estimates of the current population diverge rather widely. For the unincorporated places census figures are lacking and published estimates appear to be out of date. The very general figures assigned to the classes are based on a comparison of census data for 1940, the *Texas Almanac and State Industrial Guide, 1947-1948*, and statements by various chambers of commerce (Table 17). Not included

TABLE 17

CLASSIFICATION OF TOWNS BY SIZE[a]

Class and Towns	Population
Class I[b]	Less than 200
Class II Center Point Ingram	200-600
Class III Boerne Comfort	800-2,500
Class IV Kerrville New Braunfels	5,000-12,000

[a] These categories are based on 1940 census figures for incorporated towns, on estimates of the *Texas Almanac, 1947-1948*, on estimates of chambers of commerce, and on field observations. The figures include the highest and lowest estimates and census data.

[b] For the twenty-five towns of Class I see Fig. 2.

among the towns are forty-nine single stores, cafes, and other establishments found scattered through the countryside. Class I comprises the towns with trading establishments that deal in day-to-day necessities, chiefly groceries and oil products. The towns of Class II have added more expensive and durable goods to the array they offer local shoppers, while the Class III towns obviously outrank those of Class II both in size and in the number and kind of business and service establishments they provide. The major function of the latter towns is to serve as more diversified trading centers for the surrounding ranching and farming country. The distinction between Class III and Class IV towns is that while the former depend almost entirely on their local trade area, the latter have grown beyond this status by adding a well developed resort industry (in the case of Kerrville) and a considerable volume of manufacturing (in the case of New Braunfels).

Initially the distribution of towns was related to landforms, living water, and cypress groves. The latter factor soon lost its importance, while railroads and hard-surfaced roads have been added since to the features closely associated with towns.

A notable contrast exists between the eastern and western parts of the Guadalupe country. In Kerr County, where the valley lands are concentrated in one broad strip and the main routes of travel follow the well marked drainage lines, towns are strategically located and relatively large (Figs. 8 and 10). Comal County on the other hand has only one large town, the remainder of its town-supporting energies being dissipated on many small centers. In the Hill Country these are widely spaced through the western half of the county, where the tilled land occurs in innumerable small patches and there is little focusing of natural routes. Eight of the twenty-five Class I towns are found here. Conversely, the Prairie, capable of cultivation throughout its extent, supports nine of the twenty-five Class I towns at closely spaced intervals along its roads. Kendall County seems to be a transition area, resembling Kerr County on its western side and Comal County on the eastern. Five of the Class I towns dot the patchy fields of the east and mark the border of the great Guadalupe plaza canyon with its tributary terraces.

The largest towns are found in association with the largest areas of smooth, cultivated land. Kerrville stands at the head of the Guadalupe plaza canyon, while Comfort is near its center. Boerne dominates the second largest expanse of lowland in the

Guadalupe Hill Country. Where the Hill Country gives way to the Black Prairie, New Braunfels spreads over the Guadalupe terraces.

All four of these towns share certain additional locational features. They stand beside streams; they have railway facilities; their highway connections are superior to those of the smaller towns; they are decidedly off-center with respect to the counties in which they are located though all except Comfort are county seats.

The towns of medium size stand on terraces of the Guadalupe where tributaries join the main stream. At Ingram, though no railroad has penetrated the district, there is a focusing of routes from the divide and from the Guadalupe canyons, for the roads here follow the narrowing stream terraces. Center Point is favored by the broadening of the terrace lands in its vicinity and by the convergence here of old routes down the tributary streams and along the Guadalupe, as well as by access to the railroad, but it is overshadowed by Comfort and Kerrville.

The smallest towns are also aligned with smooth, cultivated lands though, unlike the towns in the other categories they do not in every case stand in the fields tributary to them, and in many instances these arable expanses with which they are associated are quite restricted in area.

The smallest unit which suggests urban functions is the single commercial establishment, of which forty-nine were observed in the Guadalupe Counties. In the Divide[1] and the Hill Country, the filling station, usually combined with grocery, is the most numerous type. Cafes and taverns rank second, while the remainder are amusement facilities. Eighty per cent of the total are on federal or state highways. In the Prairie, cafes and taverns are a little more numerous than filling stations and about 80 per cent of all the isolated centers follow the one federal highway.

It is a notable feature of town development in the Guadalupe Counties that the railroads were not responsible for the origin of many towns. Though they added greatly to the size and functions of several previously established centers, they initiated only four of the counties' thirty-one towns, Hunter and Bracken[2] on the Prairie and Waring and Welfare[1] in the Hill Country.

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[1] The Divide has only one store, a filling station-grocery. The information concerning the single stores is derived from the traverses.

[2] Information from Mr. Haas, County Treasurer and local historian of Comal County.

Status of the Minor Towns

The smallest of the towns, those belonging to Class I, appear to be either stagnant or declining. In some cases one or more abandoned commercial buildings bear witness to loss of trade. The residences, however, may still be occupied and in excellent condition. The one town of this class which shows unequivocal signs of growth is Legion, which stands at the gates of the Veterans Administration hospital. It has no less than five tourist courts, and a number of small new houses are being constructed between the highway and the ridge on which the hospital is built.

The two larger towns, Ingram and Center Point, present an interesting contrast. Center Point is a very old settlement that once rivaled Kerrville in size. When the railroad was built it became the shipping center for a deep narrow territory to the north and south. Since the rise of motor transport it has lost perhaps half its business, according to the estimate of one long-term resident. The business district shows this decline, but the residence section has not only retained its attractive, well kept appearance, but has added a few new houses. Since many of the people work at Kerrville and Legion, Center Point is apparently taking on some of the characteristics of a satellite. In addition to its grocery stores and garages, however, it has a dealer in agricultural implements, a lumber company, a large nursery, and a branch of a wool and mohair co-operative.

Ingram grew up later at the main road forks of the upper Guadalupe. Several trading establishments and a number of houses still cluster at this cite. The relocation of Highway 27 by-passed the old site, however, and a number of stores moved to the new road fork on a higher terrace level. A new residence addition was platted in its vicinity, giving the town a curious dual aspect. Among the enterprises housed in the handsome new flagstone buildings of New Ingram are a large lumber yard, an automobile agency, an antique shop, and a wool and mohair warehouse. For the town as a whole, the year-round ranch trade appears to be the chief source of income with the summer tourist trade as a very satisfactory extra.[2]

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[1] Frank W. Johnson and Eugene C. Barker, A History of Texas and Texans (Chicago: American Historical Society, 1914), Vol. II, p. 1015.

[2] Information from Ingram business people.

Kerrville

Kerrville, permanently established in the 1850's as a shingle camp,[1] has grown into the dominant center of Kerr County through the addition of a succession of functions. Its original site was chosen by the shingle makers for the occurrence of many giant cypress trees along the Guadalupe and of a satisfactory spring on the terrace beside the river. In 1856 Kerrville became the county seat.[2] For many decades thereafter the farm and ranch trade supported the town. In recent years, after a slow beginning as early as 1900, the resort industry has grown to proportions that rival the country trade, while the town itself has become large enough[3] to be the dominant source of business to a number of its commercial establishments. From the figures which are available[4] Kerrville would be classified as a retail center according to the system developed by Kneedler.[5] However if the figures for Kerrville could be separated from those for the county on such items as hotels and lodging places, and amusement services, it is probable that the town would be classed instead as an amusement or health resort. In the opinion of the secretary of the chamber of commerce, the support of the town is divided evenly between the country trade and the resort business.

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[1] Matilda M. Real, "A History of Kerr County, Texas" (Unpublished Master's thesis, University of Texas, 1942), p. 10. A camp started in 1846 was abandoned, then the site was reoccupied in 1853.

[2] Ibid., p. 91.

[3] Sixteenth Census of the United States: 1940. Population, Vol. I, p. 1051, gives the population of Kerrville as 5,572; the Texas Almanac and State Industrial Guide, 1947-1948 (Dallas: A. H. Belo Corp., 1947), p. 141, estimates the 1947 population to be 8,000; the chamber of commerce estimate for 1948 is 10,000.

[4] Of those employed in trade, manufacturing, and service, Kerrville has 70.7 per cent in retail trade, 7 per cent in wholesale trade, 3.5 per cent in manufacturing, and 18.6 per cent in service. These figures were computed from the Sixteenth Census of the United States: 1940. Census of Business, Vol. I, Retail Trade: 1939, Part 3, p. 562; Vol. II, Wholesale Trade, p. 1010; Vol. III, Service Establishments, p. 256; and Sixteenth Census of the United States: 1940. Manufactures: 1939, Vol. III, p. 982. The figures for manufacturing are for the whole county.

[5] Grace M. Kneedler, "Economic Classification of Cities," The Municipal Yearbook, 1945 (Chicago: The International City Managers' Association, 1946), pp. 34-36.

Site and Situation

Kerrville stands at the head of the plaza canyon of the Guadalupe River; upstream the terrace lands narrow in pronounced fashion (Fig. 10). The denser settlement of these cultivated lands, together with the products of the fields, does not comprise the whole contribution of the valleys. Since the hills rise steeply from the flats, the routes have followed along the Guadalupe and branched up its forks and tributaries. This produces a natural focusing of routes on Kerrville which shows clearly in the highway pattern.

The country traversed by these routes varies in its personality. To the east there is farming as well as ranching. Immediately west the cedar brake country of the Guadalupe canyons is the heart of the resort development. Farther west the divide in Kerr County and beyond is the country of the bigger ranches with little cultivated land.

Challenging Kerrville's domination of this territory is a ring of towns in the neighboring counties.[1] All are considerably smaller than Kerrville, Fredericksburg being the most serious rival. An additional factor in the situation of Kerrville with respect to these towns is the alignment of routes which draws both rural and towns people from the northwest and to some extent from the west through Kerrville on their way to the regional capital, San Antonio. Also significant is the nearness of San Antonio to Kerrville. Sixty-five miles over excellent roads means a trip of only two hours on the bus.

The site of Kerrville is a relatively narrow strip of the Guadalupe terrace lands grooved by two tributary creeks. An embayment of level land extends up each creek, broadening the terrace locally. Four hill spurs project into the borders of the town on the north and east. On the west the terrace drops off sharply to the Guadalupe, with its cobble-strewn floodplain beyond. Still farther west, across a very narrow band of terrace, hills and cliffs rise to complete the rim of wooded uplands that frame the site of Kerrville.

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[1] The towns are: Fredericksburg, twenty-five miles northeast, 1940 population, 3,544, 1947 estimate by the chamber of commerce, 5,000; Junction, fifty-three miles northwest, 1940 population, 2,086; Rock Springs, seventy-five miles west, 1940 population, 1,339; Leakey, sixty-eight miles southwest, 1947 *Texas Almanac* estimate, 550; Medina, twenty-five miles south, 1947 *Texas Almanac* estimate, 475; Bandera, thirty-eight miles southeast, 1947 *Texas Almanac* estimate, 1,325; Comfort, nineteen miles east, 1947 *Texas Almanac* estimate, 1,000; Boerne, thirty-five miles southeast, 1940 population, 1,271, 1947 chamber of commerce estimate, 2,500.

The Guadalupe River, so prominent a feature of Kerrville's milieu, has meant different things to the town in different stages of its growth. Initially it provided cypress for the shingle makers. Later it was the source of power for the town's grist mill. In recent years it has contributed to the resort industry by the scenery and swimming it affords. The old mill dam of cypress wood has been kept in repair for the sake of the pleasant, deep pool it creates beside the city park. At present the overflow is not being used for power though the machinery remains in place. Recently the Guadalupe assumed a new meaning for Kerrville by overflowing a section of the lower terrace in the southern portion of town. However the higher sections of the town remained immune to this flood as to previous ones. Even the lower levels will be protected in the future if the flood control project under study by the army engineers is put into operation.[1]

The street pattern, which was laid out around the courthouse at the time that Kerrville became the county seat, shows minor adaptations to the site (Fig. 22). In the south, its somewhat irregular checkerboard is bent around to follow the line of the Guadalupe River and Water Street, the old highway which parallels the river. A different effect of the site occurs where the two tributary creeks have cut into the terrace surface producing a distinct hiatus in the street pattern. In the southeast, the plat has been carried across Quinlan Creek, but six of the crossings shown are not actually in use. In the northwest, not even the street pattern bridges the gap of Town Creek, and, since the closing of a section of the old highway nearest the Guadalupe, only two streets carry through traffic over the creek. Although the plan of the streets ignores the two hills in the older, eastern part of town, resulting in some fairly steep grades, several drives in the northwest suggest the contours of the spur which projects into the plain at this point.

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[1] Statement from Mr. Saenger, secretary of the Upper Guadalupe River Authority.

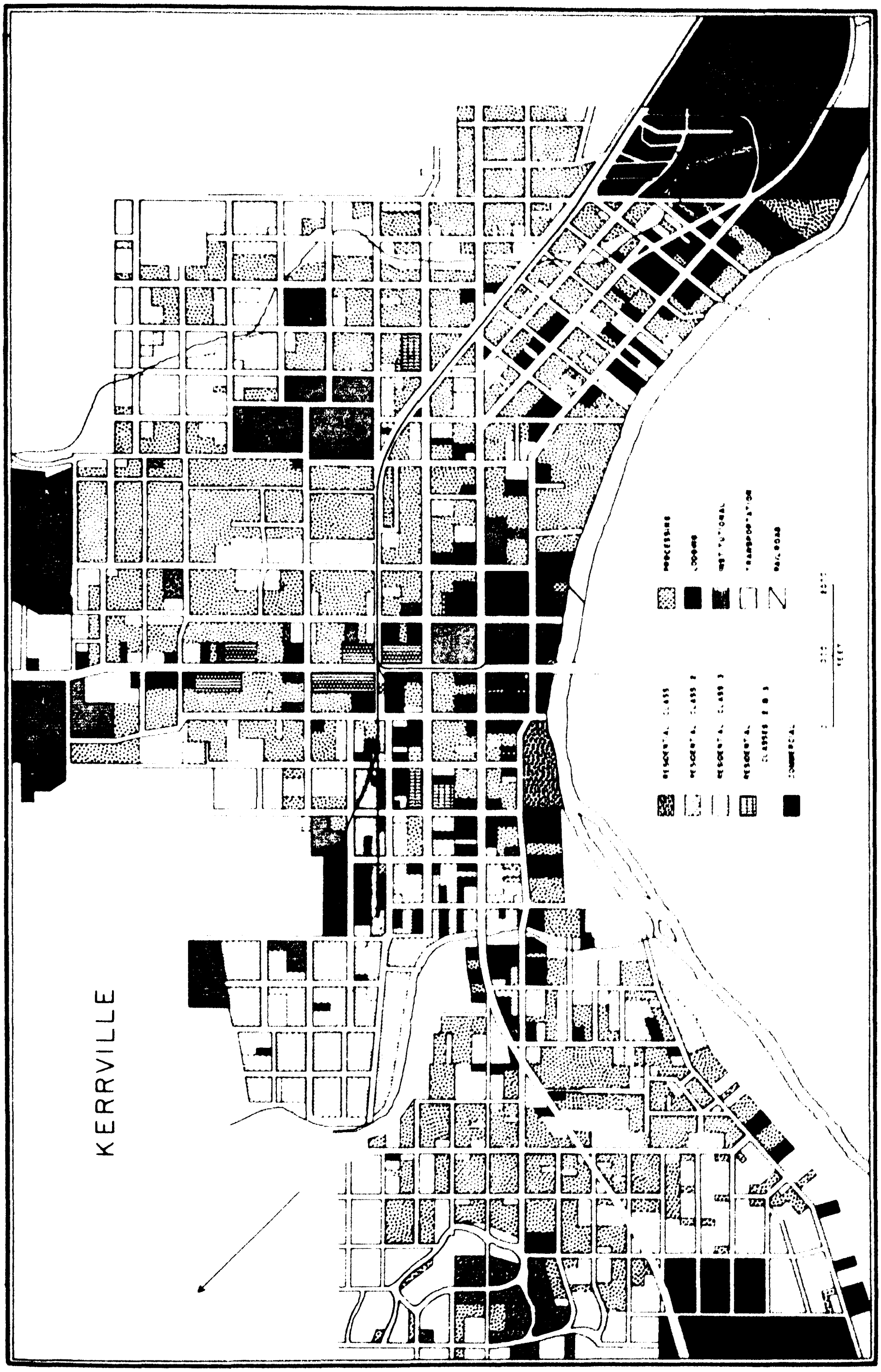
KERRVILLE
PROCESSING
LODGING
INSTITUTIONAL
TRANSPORTATION
RAILROAD
RESIDENTIAL CLASS 1
RESIDENTIAL CLASS 2
RESIDENTIAL CLASS 3
RESIDENTIAL CLASSES 2 & 3
COMMERCIAL
FEET

Figure 22

Transportation Patterns

The rail and highway lines which link Kerrville with the surrounding territory both blend into the street pattern, but their relation with their respective overland systems is of contrasting character. The railroad is a branch line with its terminus at Kerrville, while the highways form a part of a network with many ramifications carrying both local and through traffic to Kerrville from four directions.

Entering from the south, the Texas and New Orleans Railroad of the Southern Pacific System parallels the main business street at a distance of three blocks. On reaching the center of town it sends out three spurs of varying length, one of which penetrates the heart of the retail district.

Since 1942 only freight has come over the Texas and New Orleans. One train a day, carrying bulky commodities by carload lots, makes the round trip from San Antonio.[1] The Kerrville station originates little of the freight that it handles. Since wool, mohair, and livestock are the principal outbound items, seasonal variation is marked. The months of early summer and early fall have nearly twice the volume of the light months. Inbound shipments of commodities such as building materials, road material, and furniture have about ten times the volume of the outbound shipments. There is little seasonal fluctuation in this phase of the movement.

The major elements of the road pattern are the two state highways which cross the city, making use of its chief thoroughfares. Highway 27, which follows the Guadalupe, is essentially an east-west route in Kerr County, while Highway 16, bridging the Guadalupe at the center of town, trends northeast-southwest. Of the two, Highway 27 is much the more important traffic artery, carrying three to four times as many vehicles per day as Highway 16.[2]

The function of the highways in the vicinity of Kerrville is the transport of passengers, mail, parcel post, short-haul freight, and less than carload lot shipments. The facilities are as varied as their functions, and include both privately owned vehicles and public carriers. Not only do many of the local people and tourists depend on their own cars; in addition farmers and ranchers make considerable use of their own trucks and trailers in the transportation of such items as livestock and feed.

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[1] Information concerning the railroad from Mr. Holchak, agent of the Southern Pacific at Kerrville.

[2] Texas State Highway Department, "General Highway Map, Kerr County, Texas" [Austin: Texas State Highway Department, 1936], with annual average twenty-four-hour traffic volume for 1941.

The Kerrville Bus Company operates the only inter-city passenger line in Kerr County. In addition it carries first class mail and newspapers. The area served by the bus company extends from Kerrville 320 miles west, 270 miles east, 200 miles north, and 65 miles southeast, including in its range such major towns as San Antonio, Houston, Austin, and San Angelo. At these points it makes connections with other bus companies.[1] The line originated with the busy route from Kerrville to San Antonio. Since the addition of the other segments of the network, Kerrville has given place to Austin as the main travel point, but Kerrville has retained the headquarters of the company.

The nature of the bus traffic offers several hints concerning Kerrville's functions and areal relations. On the bus line, Kerrville is clearly a junction point rather than a major traffic terminus, for only about 50 per cent of the incoming passengers in summer, and 25 per cent in other seasons, stop at Kerrville. The local traffic involves many daily round trips from Kerrville to San Antonio, and from a radius of fifty miles to Kerrville. The through traffic is particularly marked on the line to the west. Of the three main bus routes, Highway 27 from San Antonio has the greatest numbers of incoming passengers. About 25 per cent fewer arrive from the west, and from the north by the Austin-Fredericksburg route. In number of outgoing passengers the San Antonio route again leads, with the Fredericksburg route second and the western route third. As would be expected, the number of trips scheduled daily reflects these traffic conditions. In seasonal volume, the predominance of June, July, and August suggest Kerrville's resort function as do the figures given above for the percentages of incoming travelers stopping at Kerrville.

For the transportation of freight three truck lines maintain docks in Kerrville. For one of these lines, the Southern Pacific Transport, Kerrville is the terminus as it is for the railroad. This line handles not only freight but mail and parcel post. For the other companies Kerrville is a node along a route with much less freight stopping than passing through. Although the territory served by each company is rigidly limited by permits, Kerrville has service on all of its main highways. The composite picture of the motor freight traffic shows similarities to the passenger traffic and the railroad traffic. There is more incoming freight from San Antonio than from the north or west. For freight San Antonio has the function of a concentrating point, receiving carload shipments from the north and east, and breaking them down for distribution.[1] Resemblance to railroad traffic appears in the preponderance of incoming over outgoing freight. One line found its outbound shipments amounting to less than a tenth of the volume of incoming traffic.[2]

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[1] Information concerning the Kerrville Bus Company was obtained from its published time table and from interviews at the company headquarters.

In addition to the main carriers listed above, Kerrville has several other forms of highway transport. Two companies, each with four trailer trucks, operate out of Kerrville, but do not maintain fixed routes or schedules. This type of transport, together with the rancher's equipment, handles most of the livestock which travels short distances. The few cattle shipped by railroad are feeders, all destined for places such as Illinois, Kansas, and Iowa.[3] Wool, feed, and many other commodities are also carried by the trailer truck operators. Highly specialized trucks bring in much of the oil and gasoline, and all the butane supply of Kerrville and its vicinity.

Kerrville is served by no pipelines or regular airlines. An airport is located about five miles south of the city on the nearest level area of adequate size.[4]

Commercial Pattern

The commercial pattern of Kerrville, though considerably fragmented, shows two major concentrations and two smaller clusters of commercial establishments. Strung out between these areas along the main thoroughfares, miscellaneous shops occur singly and in patches. Most isolated of all are the grocery stores, filling stations, and other concerns scattered through the residence district.

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[1] Information from Mr. Holchak, Southern Pacific agent at Kerrville.

[2] This information was obtained from interviews with the respective motor freight companies.

[3] Information from Mr. Holchak, agent of the Southern Pacific.

[4] Information from the Kerrville chamber of commerce.

The central business district, one of the two chief concentrations of the commercial pattern, is situated at the center of the crescent formed by the Guadalupe. Not only has it remained at this site ever since the initial settlement,[1] it forms the core from which the whole town has grown, and represents the function which until recently formed the primary support of the town. In its present extent, the chief retail district is approximately three blocks long and two blocks deep, with its longer dimension parallel to the Guadalupe. Within this area are concentrated all the financial and professional offices (with the exception of some doctors' offices), all the drygoods and clothing stores, drug stores, theaters, as well as the headquarters of such transportation concerns as the taxi and bus companies. The relatively low intensity of land use in the retail district is indicated by the fact that one-story buildings are more common than two-story buildings, the hotel and the new hospital being the only structures that rise above two stories. Further, the presence of grocery stores, an ice-making plant, and a large automobile sales agency with its garage emphasizes the difference between the Kerrville central business district and that of a metropolis.

The second of Kerrville's two main commercial concentrations is the wholesale district. It is located along the railroad from the point where the sidings branch off to the end of the line. Not all the firms in this area are on sidings, however. Notable features of this concentration are the freight docks of the railroad and the three motor freight lines, the three wholesale groceries, the storage tanks of five oil companies, the wool and mohair warehouse, two feed companies, two lumber companies, a cement products company, a bottling works, and the plants of the city utilities, water, gas, and electricity.

The two outlying clusters of shops differ from each other in type of location and development. The commercial area in the south part of Kerrville stands just inside the city limits on the two thoroughfares which join to form Highway 27. Though there are a few such establishments as the lumber company, cafes and grocery stores and filling stations occupy most of the area. The other commercial concentration extends along the two main streets for several blocks south of their junction to form the north end of Highway 27. Not only is this area well within the city; it actually forms a discontinuous extension of the central business district, accommodating a great variety of business concerns such as a neon sign shop, a lumber yard, and automobile agencies. Cafes and groceries are less conspicuous in the make-up of this area.

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[1] Statement from Mr. Cone, the city manager.

The importance of retail trade and the relative insignificance of wholesale trade to Kerrville are suggested both by the areas they occupy and by the proportions of the working force they employ. In the so-called wholesale district much of the area is actually taken up by firms retailing such bulky commodities as feed and building materials. The products handled by Kerrville's wholesale concerns are oil products, groceries, and beverages.

The source of business for Kerrville's retail stores comes from the residents themselves, from the neighboring rural districts and small towns, and from the summer tourists.[1] Naturally the proportion varies with the store. Some, like the office supply shop, the drug stores, and the groceries depend largely on Kerrville, though summer tourists mean a 30 per cent increase in the sales of one of the latter. For other stores both the Kerrville trade and that from the vicinity rank high, while the summer business is negligible. Furniture stores and dry goods stores are representative of this group. Finally several types of business are oriented to the trade areas outside of Kerrville. The butane company is excluded from the Kerrville market by an ordinance prohibiting butane tanks, though the appliances it sells may go to the Kerrville residents. Feed stores and the wool and mohair warehouse are obviously supported by the farm and ranch trade.

Among the trading establishments of Kerrville the Schreiner Wool and Mohair Commission occupies a unique position. Like other Texas wool warehouses, its function normally includes not only the sale and shipping of wool for the growers but a considerable amount of financing as well.[2] Even wool which is not sold through the warehouse may be sent to it for shipment to insure proper weighing, marking, and loading of the bags.[1] The Schreiner warehouse grew out of the dealings of a general merchandise store, and, true to its beginnings, has drawn much trade to the town. Of all the wool and mohair warehouses in the Guadalupe Counties, it handles the largest volume.[2] Much of its present impetus probably dates back to the period before good roads when the warehouse standing at the railroad terminus could draw on a much wider trade territory than its rivals to the east. Today its trade area still extends some fifty or sixty miles west, but little more than half that far east.[3] Eighty per cent of the fleeces goes out by rail to Houston, and by boat from Houston to Boston and other big wool markets of the northeast. The remaining 20 per cent goes by truck to Houston.

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[1] Information from the business people and the chamber of commerce of Kerrville.

[2] Traweek, op. cit., p. 114.

The present trading areas of Kerrville have been greatly affected by rapid travel along good roads. It seems apparent from interviews with both ranchers and towns people that there is a strong tendency for buyers to shop around among the neighboring towns. No one town has the dominant position in its trade territory that it could claim before good roads. The extent of the present trade territory varies, of course, with the store. Some, like the petroleum products dealers and one wholesale grocer, have assigned territories. These range in extent from less than the area of Kerr County to nearly all of the eastern part of the hill country. Where the territory is determined by competition, its outer range appears to include the circle of smaller towns listed above. The core of the trade territory, however, is suggested by what may be termed the traffic divides[4] on the main highways leading to Kerrville. To the east these lie at distances of nine to twelve and a half miles from the city limits; to the north, eleven or twelve miles; to the south, fourteen miles; and to the northwest and west, twenty-four and a half and forty-nine miles, respectively. The trading radius of a greater number of the concerns interviewed approximated these figures than the outer range given above.

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[1] Ibid.

[2] Information from interviews with Mr. Garret of the Schreiner Wool and Mohair Commission and with representatives of the other warehouses in the district.

[3] Information from Mr. Garret.

[4] On the "General Highway Maps," there is a definite increase in traffic volume near the larger towns. By tracing a highway from one such town to the next the minimum traffic figure can usually be found. This is given the designation traffic divide. In determining the traffic divides of Kerrville, reference was made to the sheets for Kerr County and the surrounding counties, Gillespie, Kimble, Edwards, Real, Bandera, and Kendall.

The adequacy of the commercial pattern and its functioning is suggested by several items. One is the fact that the demand for store space seems to be good. The only vacant building observed had apparently just been built. Two stores under construction had already been leased, and further building is under way on the main shopping street. A scarcity of suitable buildings with railroad sidings is suggested by the fact that only two of the five lumber companies are so served, and by the complaint of one feed dealer who lacks a siding. Not only the new construction, but the excellent upkeep and thriving appearance of the retail stores indicates satisfactory functioning. As far as services rendered are concerned, the business development has reached a point where, in the opinion of the chamber of commerce, further duplication is probably unwarranted, though there is a place for new types of business.

Processing Pattern

It is evident both from the employment figures given above and from the small area occupied (Fig. 22) that the processing pattern forms a minor element in Kerrville's livelihood structure. Most of the establishments are small, serving only Kerrville or Kerrville and its trade territory.[1] All except two employ less than ten people. The roster includes such items as a dairy products company, bakeries, an ice company, two bottlers, two newspapers and printing shops, machine and metal working shops, a cement products company, and shops making furniture, awnings, venetian blinds, and saddles.

The processing pattern shows no concentration. Most of the establishments are scattered through the main retail district, with two in the outlying retail areas, one in residence territory and two on the railroad. One of the latter illustrates the shortage of business buildings by occupying the former passenger station of the railroad though the space is inadequate.

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[1] Information from interviews at the processing establishments and from the Bureau of Business Research, Directory of Texas Manufacturers, p. 110.

Resort Pattern

The forms which make up the resort pattern of Kerrville are lodging facilities of varying types. The most numerous are the tourist courts, seventeen of which are clustered in three general areas (Fig. 22). From the point where Highway 27 branches into two streets at the southern city limits, tourist courts appear at intervals through a distance of about a mile and three quarters. Ten of the seventeen courts in Kerrville are found along these two streets. In the northwest part of town six courts follow the old and the new sections of Highway 27, locally called the Junction road. Four are outside the city limits. To the northeast, on Highway 16, one large court stands a little beyond the city limits. The tendency toward a peripheral location of courts is less marked than their association with the main highways. The attraction exerted by the Guadalupe is suggested by the location of ten out of the seventeen courts on the river side of the street.

Trailer parks are much less numerous. Two stand back to back facing the old and the new Junction roads in the north part of town. The third is a small lot on the street which forms a continuation of Highway 16 in the northeast part of town.

All three of the hotels are in the downtown business district, but two are relatively small. The third is the modern, eight-story Blue Bonnet Hotel standing between the main business district and Kerrville's riverside park on the Guadalupe. The Blue Bonnet serves both as a commercial and as a resort hotel.[1]

A unique feature of Kerrville's resort industry is the church encampment. The Westminster Encampment, owned by the Texas Synod of the Presbyterian Church, is on the south margin of the city. When it was established in 1906, it stood not only outside the city limits, but some little distance from town following Quinlan Creek to its juncture with the Guadalupe.[2] Part of the attractive irregularity of its site constitutes a flood hazard, for the low ground along the creek is covered when the waters are up. The camp lodges accommodate an average of 150 people at a time during the summer, with special conferences bringing in as many as 400 people in some instances. Even in the winter, about seventy people were living in the lodges in 1948. A similar Methodist encampment, the Methodist Kerrville Assembly, stands on a hill north of town.

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[1] See chap. iii for the source of the tourist business and the resort season.

[2] Information from Mrs. McCutchen of Kerrville.

A different style of accommodation emphasizes Kerrville's importance as a health resort. For decades Kerrville has been known as a health center for tuberculosis. At present there are three small, private sanitariums with a total capacity of about seventy beds.[1] Just across the Guadalupe stands the Kerrville State Sanatorium, which is to be transformed into a hospital for spastic children. To the south at a distance of about two miles stands the Veterans Administration Hospital, with a capacity of eight hundred and a staff of four hundred.[2] Not only do these hospitals offer employment, but also they attract a considerable number of visitors.

The resort function is difficult to evaluate in a quantitative fashion. As indicated above, no separate figures for Kerrville have been published by the census. However the chamber of commerce considers the resort business equal in importance to the country trade, the two being the primary support of the town.

Kerrville's function in the resort industry of the Guadalupe Counties comprises more than serving as headquarters for the tourists stopping in the town's lodging places. Its chamber of commerce assists in the advertising and in handling the inquiries which affect all the resorts of the county. Further, Kerrville is a convenient center for shopping and receiving mail. It provides such amusement facilities as the golf course and the swimming pool, together with occasional special events like the Fourth of July celebration.

Institutional Pattern

The institutional pattern of Kerrville is designed primarily to serve the community rather than to attract visitors. The usual utilities, school, church, hospital, and park facilities are found in the residence area and on the margin of the business district. Governmental functions are concentrated in the centrally located county courthouse and the adjacent city hall. The former draws people from all parts of the county, while the Kerrville schools serve most of Precinct 1. Only Schreiner Institute, however, brings in visitors from a greater distance. It is a Presbyterian junior college which had an enrollment of about three hundred in the regular session of 1946-47.[1]

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[1] Information from Mr. Saenger of the chamber of commerce.

[2] Information from Mr. Via of the Veterans Administration Hospital.

Residence Pattern

In classifying the residence types of Kerrville, only three categories were recognized, Class I, or high quality residences, Class II, or medium quality, and Class III residences which are generally small and cheap in construction, though in some cases they are larger houses in poor repair.

The largest area of high quality residences occurs on the wooded slopes and top of the hill in the northwest part of town. This area is well isolated from undesirable land use types and has attractive site qualities. Another small area of Class I houses stands on top of the hill that is opposite the center of town. The third area adjoining the central business district is made up of older houses in large, landscaped yards.

The poorer quality houses cluster in the north and the far eastern parts of town with smaller areas among the medium quality residences. In the east, the houses climb from the narrow terrace onto the slopes of a rocky hill. Here, from the vacant creek bed to the hill, open spaces with occasional groves of trees and milk cows give quite a rural look to the landscape. In the north part of town the section occupied by the colored people is isolated from the remainder of the residence development by the wide, deep, vacant trench of Town Creek on the west, and by the wholesale district on the east.

The greater part of the residence area is made up of medium quality houses, generally well kept frame structures. As in many small towns, this quality of residence development in places extends to the borders of commercial districts. However, most of the new building appears to be in the northwestern part of town. Here on the terrace between the creek and the hill there is a good deal of vacant land still available for development.

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[1] W. C. Eells, American Junior Colleges (Washington: American Council on Education, 1948), p. 388.

Throughout Kerrville the single-family residence with its yard is virtually universal. Recognizable apartment buildings were seen only on one block in the vicinity of the schools.

New Braunfels

New Braunfels differs from Kerrville both in its origin and in its subsequent functional specialization. At its inception it formed the core of a closely integrated agricultural colony organized and financed by a group of titled Germans, the Mainzer Adelsverein, and, as a consequence, experienced a rapid influx of settlers in its early stages. Beginning in March of 1845, approximately seven hundred Germans arrived at the designated site and proceeded to lay out the town and construct houses and shops.[1] Their numbers were swelled the following winter and spring by the arrival of the survivors from the four thousand who had embarked for Texas in the fall of 1845.[2] Many of the latter group proceeded to the site of Fredericksburg, in the hill country to the northwest. However, New Braunfels, though serving as a way station for the Fredericksburg settlement, diverted a number of the immigrants to its own lands, so that by 1850 the town already had 1,298 settlers.[3] The site was selected by Prince Solms-Braunfels, the representative of the Mainzer Adelsverein, because of the combined attractions of good water, building stone, cedar and cypress timber, and fertile farm land in a safe location along the Camino Real.[4] Inland from this old colonial route there was danger of Indian attacks. At this early period, when towns and their surrounding farm lands were nearly self-sufficient, New Braunfels was more than a trading center, for it provided the artisans and the grist and saw mills which supplied most of the colony's needs.[5]

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[1] A Twentieth Century History of Southwest Texas (New York: The Lewis Publishing Co., 1907), Vol. I, p. 134.

[2] Ibid., p. 135.

[3] U.S. Census Office, Seventh Census of the United States: 1850 (Washington: R. Armstrong, 1853), p. 504.

[4] Information from Mr. Haas, Treasurer of Comal County and local historian.

[5] Ibid.

With the arrival of the first railroad in 1880, the local artisans suffered from the competition of northern manufactured products.[1] Nevertheless, through the 1890's and the early years of the twentieth century the town retained such enterprises as its grist mills, its cotton seed oil mill, and its tannery,[2] while serving as the trading center for the surrounding farm and ranch lands. Other industries were added later. A lime plant was constructed nearby as early as 1908, but the cotton textile mill, the hosiery mills, and other establishments were started during the last three decades. At present New Braunfels would be classed as an industrial town, having 53 per cent of its workers in trade, manufacturing, and service employed in manufacturing and 36 per cent in retail trade.[3] There is in addition a summer resort business of some magnitude based largely on the attractions of abundant clear water.

Site and Situation

New Braunfels stands on the inner margin of the Black Prairie where the Comal Springs break from the foot of the Balcones Escarpment (Fig. 10). It forms one of a chain of towns located at the base of, or in sight of the escarpment, the nearer ones of importance being San Antonio, twenty-six miles southwest, San Marcos, and Austin, seventeen miles and thirty-three miles northeast, respectively. While San Marcos is of co-ordinate size, both of the other cities overshadow New Braunfels. To the southeast, at a distance of thirteen miles, lies Seguin, another town comparable to New Braunfels in size. Thus in the more closely settled farming country of the Prairie, New Braunfels has rivals nearby. To the west, however, in the thinly settled Hill Country, there is no town that can challenge New Braunfels[4] in the whole of Comal County, which stretches back some twenty-five miles from its county seat (Fig. 8).

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[1] *Ibid.*

[2] *Texas Almanac and State Industrial Guide for 1904* (Galveston and Dallas: A. H. Belo Co., n.d.), p. 241.

[3] Percentages computed from *Sixteenth Census of the United States: 1940. Census of Business: 1939, Vol. I, Retail Trade: 1939, Part 3*, p. 560; Vol. II, Wholesale Trade: 1939, p. 1008; Vol. III, Service Establishments: 1939, p. 264; and from *Sixteenth Census of the United States: 1940. Manufactures: 1939, Vol. III*, p. 982. Only county figures were available for wholesale trade and manufacturing. The classification used is that of Grace M. Kneedler, referred to above in the discussion of Kerrville.

[3] In 1940 the population of New Braunfels was 6,976; the

The dual character of New Braunfels' hinterland is shared by the town's immediate site (Fig. 23). Terraces of two levels comprise the greater part of the site, but in the southern part of town a prominent hill with a broad, smooth summit rises sharply forty feet or more above the terrace level. It is an outlying spur from the higher crests of the Prairie just beyond the county line. In the northwest the Balcones forms a wooded, hundred-foot cliff above Comal Springs, and its smooth crest lifts a portion of the town into the borders of the Hill Country. Through the middle of New Braunfels the Comal River flows in a series of meanders which are entrenched forty to sixty feet below the terrace levels. Above the dams in Landa Park both the Comal River, on the east, and the old canal, on the west, lie only a few feet below the general terrace level. Along the eastern border of town the Guadalupe River has carved entrenched meanders comparable to those of the Comal. Because of the height of the terraces above the streams, flood waters have never invaded the main body of town, though a shallow spread of water once covered part of the lower terrace between Comal Springs and the railroad.[1]

The street pattern, which is an irregular checkerboard with several minor variations in alignment, grew from the old center around the plaza. Its design gives no clew to the landforms it crosses except where the streets break off at the streams. Within the city the Comal, with its southwestern tributary, the Dry Comal, is bridged three times, while the Guadalupe is bridged only twice, by the old and the new highways.

Transportation Patterns

In the transportation pattern of Texas, New Braunfels has been throughout its history a node on a main route. At the time of its settlement, the town stood on the Camino Real, which had linked San Antonio and the Rio Grande with Nacogdoches and the country to the east ever since Texas was a Spanish colony. As wagon and stage travel gave way to railroads and highways, the

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1947 estimate of the Texas Almanac was 8,300; the 1948 estimate of the chamber of commerce was 12,000.

[1] Information from the editor of the Neu-Braunfelser Zeitung.

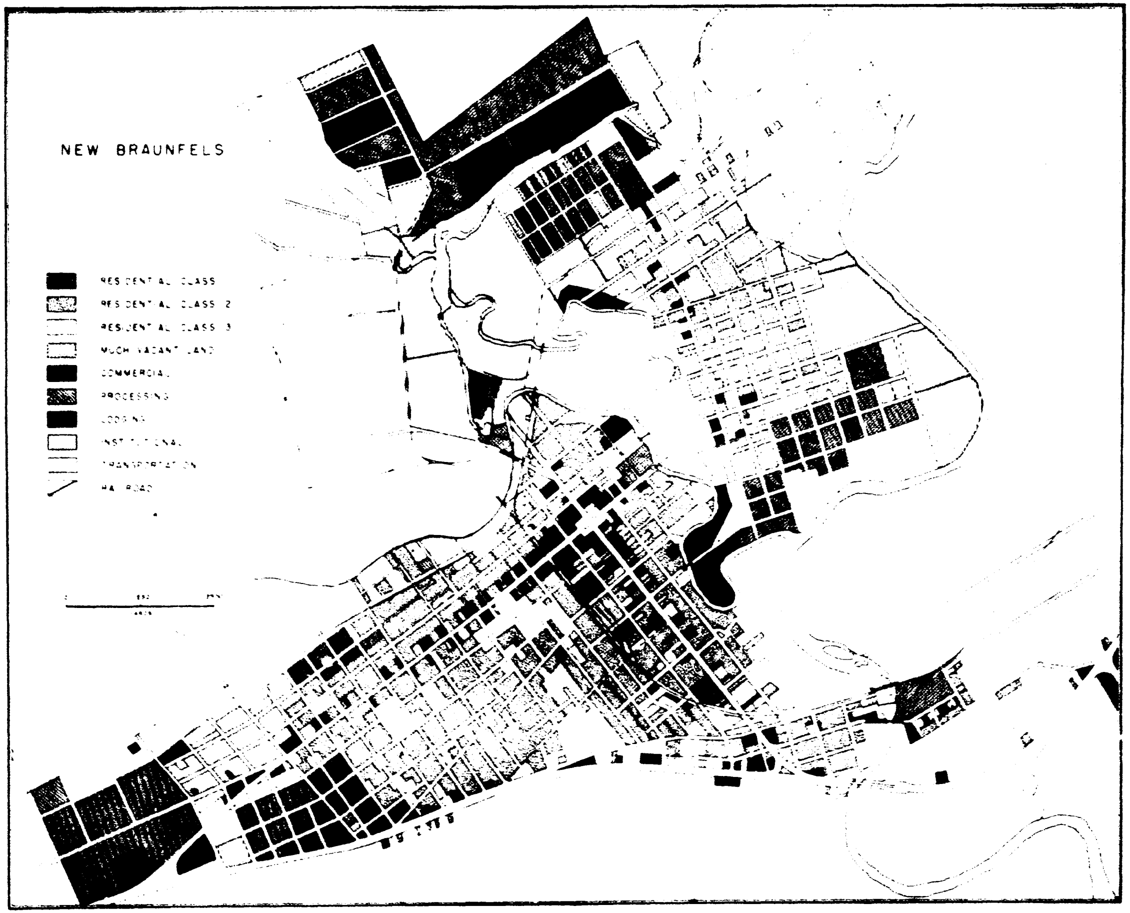
NEW BRAUNFELS
RESIDENTIAL CLASS
RESIDENTIAL CLASS 2
RESIDENTIAL CLASS 3
MUCH VACANT LAND
COMMERCIAL
PROCESSING
LODGING
INSTITUTIONAL
TRANSPORTATION
RAILROAD

Figure 23

Comal section of the route persisted, paralleling the trend of the Prairie. At present there is much more traffic passing through New Braunfels on the public carriers than there is stopping off, a fact which emphasizes the nodal character of a small city along a main route. However the radiating pattern of the state and local roads, together with the traffic figures for all the highways, gives clear indication of New Braunfels' focal character with respect to its own territory.

The segment of the railroad pattern which lies in New Braunfels forms an irregular cross (Fig. 23). The Missouri Pacific, which built into the city earlier, cuts through the center of town, its stations being within two blocks of the plaza. The Katy, a later arrival, skirts the western side of the main built-up area. Both railroads send sidings into Landa Park and to the industries along their lines. Through their switching service a plant with a spur from one line also obtains service from the other.

New Braunfels has good railroad service, and originates an amount of freight that is remarkable for a town of its size.[1] Because it is served by two main lines, New Braunfels has ten passenger trains a day, five north-bound and five south-bound, together with daily freight service on both lines.[2] The greater part of the town's freight shipments are carload lot rather than less than carload lot, and the outgoing shipments are larger than the incoming. In volume, the freight movement shows little seasonal fluctuation. Among the big shippers are the lime plant, the crushed rock plant, the textile mill and the flour and feed mills.[3]

The highway pattern in and around New Braunfels shows a greater elaboration than that of the railroads, and accommodates a greater variety of carriers. The federal highway, which is the most prominent element of the highway pattern both on the map and in the landscape, is an important route extending from the north past New Braunfels and San Antonio to join the Pan American highway at the Mexican border. On the opposite side of New Braunfels, a state highway leads west into the Hill Country, while ten local roads extend from the fringes of the town into the surrounding countryside. Among the carriers using the highway are four motor freight lines. One of these, taken as a sample, shows more incoming than outgoing volume, unlike the railroads. However the town's manufactured goods constitute a greater portion of the outbound shipments than do miscellaneous lots, and there is little seasonal variation in the volume.[1] Passenger service on the highways is provided by the Greyhound Bus Company, which operates twelve schedules a day through New Braunfels.[2] The bus company differs from the other carriers in experiencing a summer rush season from June through September. Both the bus line and the truck line operate on the federal highway between Austin and San Antonio, but do not penetrate the Comal Hill Country.

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[1] Information from the Missouri Pacific freight office at New Braunfels.

[2] Information from the Dallas offices of the Missouri Pacific and the Katy railroads.

[3] Information from the New Braunfels offices of the Katy and the Missouri Pacific.

Two other transportation patterns bear out the evidence of the railway and highway patterns with respect to New Braunfels' main-line status. In the United Gas Company's system, New Braunfels is a juncture point for pipelines coming from San Antonio and branching out to Austin and Seguin, in addition to the lines serving the New Braunfels area.[3] For the Lower Colorado River Authority, New Braunfels is a switching point from which five highpower lines ray out, two to San Antonio, and one each to Austin, to the southeast toward Seguin, and to the Hill Country, the latter passing through Boerne and Comfort to a terminus at Kerrville.[4]

Commercial Pattern

The commercial pattern of New Braunfels shows a definite relation to the highway pattern. From the main business section on the blocks around the plaza, commercial establishments have grown outward in an L-shaped pattern along the two main streets which served as links in the highway system (Fig. 23). Nearl all the isolated stores in the residence districts also coinc with the most recent course of the main Prairie highway, or w its earlier routes through Milltown (the section beside the c mill, east of the Guadalupe) and through Comal Town (the port of New Braunfels between the Comal and the Guadalupe).

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[1] Information from the New Braunfels office of the Central Freight Lines.

[2] Information from the New Braunfels office of the Greyhound Bus Co.

[3] Information from the New Braunfels office of the United Gas Co.

[4] Information from the New Braunfels office of the Lower Colorado River Authority.

Within the main business district the most intensivel developed retail shopping district lies in the four blocks su rounding the plaza, and in the two blocks facing San Antonio Street westward between the plaza and the railroad. Here are concentrated all the department stores, drug stores, banks, jewelers, and theaters. The second stories, especially in th vicinity of the plaza, accommodate such offices as those of p fessional people, of the telephone company, and of Servtex. ever the relatively low intensity of development of the shopp center which is characteristic of small cities appears here a in Kerrville. One-story and two-story buildings are characte istic, and in addition such establishments as a filling stati a bakery, and a meat market are found on the main street.

The two long extensions of commercial development to the southwest, beyond the railroad, and to the southeast show mixture of residences of several qualities with a variety of stores. Filling stations and grocery stores are the most num but there are also automobile agencies, furniture stores, cle cafes, feed stores, and many other types of shops.

Along the federal highway, filling stations and cafes comprise the greater number of the trading establishments.

On the fringe of the main shopping center, along the that parallels the Missouri Pacific Railroad, the complexion the commercial development changes somewhat. Here are found companies, farm machinery dealers, a wool and mohair co-opera a moving company, as well as several processing companies. O these, the lumber companies and the wool and mohair concern a located on railroad sidings, along with two processing compan

Two outlying areas complete the commercial pattern of Braunfels. There is a concentration of oil storage along the tracks in Comal Town. Also in the east part of the city is t little cluster of stores at Milltown. In addition to the mil own retail cotton goods store, there are two general stores, filling station, and a garage.

The trading area of New Braunfels resembles that of Kerrville in several respects. It also extends farther west into the ranching country than east, where the cultivated lands support nearby rivals. New Braunfels like Kerrville no longer dominates the trade in the immediate countryside to the extent that it did in the days before good roads. One person estimated that the ranchers and farmers went into San Antonio as often as once a week, the advertisements of such concerns as Sears Roebuck in the San Antonio papers (which, with the Austin journals, are the daily papers in this area) having great drawing power. At New Braunfels even more than at Kerrville the town itself has become the chief source of business to a great many of the trading concerns. With a large fraction of the county's labor force employed in the town's industries, and with little seasonal variation in the operations of the factories, it is not surprising that the town should have assumed this leading role. Statistical evidence of the situation may be found in the 1940 census, which shows the value of manufactured goods in Comal County to be over five times as great as the gross value of the agricultural products.[1] Even the factory payroll of the county was nearly as large as the gross value of its agricultural products.[2] This is a decided change from the earlier stage when the support of the town was derived entirely from the ranch and farm country. In those days the prevalent cotton culture of the more densely settled Prairie resulted in a very slack summer trading season, while at present New Braunfels is known as a "twelve-months town," experiencing a slowing up only in the winter months that follow the Christmas rush and precede spring activity.[3]

In area the trading territory of New Braunfels would, of course, vary with each concern, but, as in the case of Kerrville, it is possible to estimate an outer and an inner zone. The chamber of commerce estimates an over-all trading radius of approximately thirty miles. The wool and mohair co-operative, a company with a wide range of operations, draws its trade from an area that extends about forty miles to the northwest and north in the hill country, and about fifteen miles southeast into the prairie.[1] Another concern, operating on assigned territory, serves Comal County and Blanco County, which lies immediately northwest of Comal. These figures give an indication of the outer trading area of New Braunfels. The inner territory with which the town would logically have a stronger tie is suggested by the traffic divides along the roads.[2] On the state highway westward toward Boerne, the divide is twenty-one miles from New Braunfels; to the north toward Hancock, twenty-two miles; along the federal highway southwestward toward San Antonio, eleven miles, and northeast toward San Marcos, ten miles. The issue is confused along the road that penetrates southeast toward Seguin by the presence of a small settlement, but the divide appears to be either at the county line, about three miles from New Braunfels, or a mile beyond, in the next county.

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[1] Sixteenth Census of the United States: 1940. Manufactures: 1939, Vol. III, p. 982, and Sixteenth Census of the United States: 1940. Agriculture, Third Series, Texas, p. 38.

[2] Ibid.

[3] Information from Mr. A. J. Eiband, of New Braunfels.

The satisfactory functioning of the New Braunfels commercial pattern is suggested by the well kept appearance of the whole trading district and by the scarcity of vacant store buildings. Although four vacancies were observed in older buildings along the street that extends southeast from the plaza, on the same street north of the plaza a large new commercial building is under construction.

Processing Pattern

The processing pattern of New Braunfels represents in its present stage an evolution that has taken place through the course of a century. The oldest mill in town, the Dittlinger feed mill in Landa Park, stands on the site of a water-powered grist mill constructed in 1846.[3] With the arrival of railroad transportation and the abandonment of water power by the mills, riverside sites which acquired railroad sidings have factories still standing beside their dams, as in the case of the cotton textile mill and the grain mills. However three other mill sites on the Comal which lack railroads have failed to attract new manufacturing concerns since the original enterprises ceased operations. At present, the larger manufacturing plants of New Braunfels are found along the railroad lines either at the edge of the main retail district or on the fringe of town (Fig. 23). Smaller processing shops are scattered through the business districts and in areas that are dominantly residential.

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[1] Information from Mr. Ehlers, of Producer's Wool and Mohair Coöperative.

[2] In determining the traffic divides of New Braunfels reference was made to the "General Highway Maps" for Comal County and the surrounding counties, Kendall, Bexar, Guadalupe, Hays, and Blanco.

[3] Information from Mr. Haas, Comal County Treasurer.

Among the attractions of New Braunfels for industrial development are satisfactory labor, cheap power, good transportation, abundant clean water, and flat land for factory sites. Only in the case of the lime and rock plants nearby was location in the immediate vicinity of raw materials imperative. Of these advantages, the tranquil labor relations of the town, and the absence of work stoppages are advertised by the chamber of commerce in one of its publications. Cheap power is available both from the large thermal-electric plant within the city limits and from the gas fields of South Texas.[1] The other factors have been described above.

The areal relations of the processing pattern can best be illustrated by an examination of several sample enterprises.

The Dittlinger Roller Mills represent the survival and successful operation in a relatively unfavorable location of two old milling enterprises that were established to serve the local market.[2] Formerly the grain handled was produced in the vicinity, but at present the flour, which is processed at the roller mills on the Comal River near the retail district, is milled from hard winter wheat shipped in from the Texas Panhandle, Oklahoma, and, to a lesser extent, Kansas. Because of railroad rate structures, mills in the above wheat-growing districts can ship flour to New Braunfels as cheaply as the Dittlinger mills can produce it, but the Dittlinger mills cannot ship flour back to the north at competitive prices. As a consequence, the chief market for Dittlinger flour is the area from New Braunfels and Austin south to the Gulf, and east and west to the boundaries of the state. In addition, there is some flour shipped by water to the Atlantic Coast, and some exported. The feed made at the Landa Park mill is sold largely in Texas. Though some of the corn is bought locally, the bulk of all the grain is shipped in. In addition, the feed mill imports soy bean meal and meat scraps from the Middle West, fish meal from the Pacific Coast, and fish oil from the East Coast for its balanced feeds. The greater part of all the shipments, both of raw materials and of finished products, travels by rail.

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[1] Information concerning the source of the gas was obtained from the New Braunfels office of the United Gas Company.

[2] Information concerning the Dittlinger Roller Mills Company was obtained from Mr. Liebscher.

The New Braunfels Textile Mills was a later arrival, having been built in 1922 beside a previously constructed dam on the Guadalupe.[1] At present the power plant, operated by the Lower Colorado River Authority, is of little importance, but the factory still makes use of the river water in its dyeing processes. The mill performs all the operations which transform the cotton bales into highly styled fabrics. Drawing the raw material from all parts of Texas, the mill sells its product throughout the United States and enters the export market. Most of the shipments move into and out of the mill by rail.

The McGaugh Hosiery Mill,[2] which stands on the railroad at the southwestern edge of town, was established after the days of direct use of water power. At present it receives all its raw material by railroad in package lots from Delaware because only nylon is knitted at this plant. The hosiery then goes to the Dallas finishing plant by truck because the night connections allow dyeing operations to be started early the next morning. The McGaugh products are sold in all parts of the United States except the East, and are handled chiefly by drug stores.

Still more recent has been the advent of the Pioneer Worsted Company, which produces wool tops.[3] Starting along a railroad siding on the south margin of the main business district, the company has expanded to include the whole block. It draws its wool supply not only from Texas, but from such foreign realms as Australia, New Zealand, and South America. The main product, wool tops, is sold largely to worsted manufacturers in New England, while the by-product noils, though usually sent to New England, may also go to Philadelphia, Chicago, or other centers. The

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[1] The information concerning the mills was obtained from Mr. McKenna, of the New Braunfels Textile Mills.

[2] Information from Mr. Henne, of the McGaugh Hosiery Mill.

[3] Information from Mr. Katz, of the Pioneer Worsted Company.

Texas wools arrive by truck, but the remainder of the incoming and outgoing shipments are by rail chiefly.

Other manufacturing plants in New Braunfels range from a second hosiery mill, two dress manufacturers, and leather and boot making companies, through food processors such as bottlers and a potato chip company, to establishments like the bakeries, the creamery, and the machine shops, which are concerned chiefly with the local market.

Among the processing plants in New Braunfels the group of textile manufacturers lead by a wide margin in the employment they afford. Second in rank are the grain mills, though they may be rivaled in the county as a whole by the lime and rock plants.

The importance of New Braunfels' processing pattern has been alluded to above in terms of the value of its products and its relative position in the employment structure of the town. From a consideration of the individual factories it is also apparent that the operations of the larger manufacturing concerns involve a much wider area than do those of the New Braunfels trading establishments.

Institutional Pattern

In addition to the usual facilities designed to serve the town and the county, the institutional pattern of New Braunfels includes two remarkable features which are of interest to a wider area.

On the western margin of town Landa Park, owned by the city, includes within its borders a part of the Comal Springs, together with the lake and swimming pool supplied by their waters. East of the lake is the Landa Park Golf Course. Extending south from the lake is the old canal, itself a very attractive addition to the park. The crystal waters of the springs well out from cracks at the base of a limestone slope and flow away over a rocky bed with patches of magenta and green water plants. The banks of the springs and the lake are overhung by trees carrying long streamers of Spanish moss, and backed by the steep, wooded cliff. It is easy to understand the perennial attractions of the site, not only for the people of New Braunfels, but for outsiders as well.

Near the canal's juncture with the Dry Comal at the southern border of Landa Park, stands the Comal Power Plant, which has a capacity of 60,000 kilowatts.[1] Unlike its small predecessor across the canal, the Comal Plant does not develop hydroelectricity, but is powered with natural gas. Water from the Comal canal, after treatment for lime, is used for steam. In addition, the natural flow of this artificial stream supplies the cooling water for the condensers, the steady, low temperature allowing particularly economical operations. The plant is run by the Lower Colorado River Authority, and contributes to the regional power supply, only about 5 per cent of the power being used locally, and a large percentage going to San Antonio. Across the canal from the Comal Power Plant is the old Landa Plant, which has a capacity of 600 kilowatts.[2] It, with the Planters and Merchants Plant (capacity 100 kilowatts[3]) on the Guadalupe beside the textile mill, represents the only surviving use of water power in New Braunfels. These two small plants are also operated by the Lower Colorado River Authority.

The facilities which make up the remainder of the institutional pattern are designed primarily for the use of the city and the county. The city water works stand at the head of the Comal Springs (Fig. 23). Here three cased wells have been substituted for the water supplied by the springs. Along the Guadalupe River to the east are found, in order from north to south, the incinerator, the county fair grounds, two cemeteries, and a city park. On the plaza is the county courthouse, and on the north border of the main business district, the city hall and the hospital. Churches are found on the borders of the business district and in the residential areas. Schools for the most part stand in the older residential areas.

Resort Pattern

The major tourist attraction of New Braunfels has long been the clear waters of the Comal. In the earlier days of the century both of the town's railroads built sidings into the park area and organized excursions with special trains. The *Texas*

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[1] Information on the Comal Power Plant from Mr. Francis, of the New Braunfels office of the Lower Colorado River Authority.

[2] Information from Mr. Starcke, general manager of the Lower Colorado River Authority.

[3] *Ibid.*

Almanac and State Industrial Guide for 1904 comments on the excursions, particularly those from Austin, San Marcos, and San Antonio, and estimates that 500 to 2,000 strangers came to the park on Sundays. Special trains were also run from Dallas, Fort Worth, and Houston, making the trip overnight, staying the day, and returning the next night.[1] At present the town draws many weekenders from the nearby San Antonio, and the swimming pool is one of its chief attractions. On the Fourth of July the crowds are especially large. With the advent of cars, drives through the adjacent Hill Country, particularly up the Guadalupe canyon road toward Sattler, provide amusement for the tourists staying at New Braunfels.

The lodgings for tourists are strung along the banks of the Comal and along the federal highway (Fig. 23). In the last meander of the Comal stand two camps of the older style construction, with frame cabins having long screened panels around their sides. Upstream there are more modern tourist camps, and summer cottages equipped for housekeeping. Along the federal highway, five tourist courts cater to the transient trade as well as the summer visitors. In the downtown business section stand three hotels conveniently located for commercial travelers.

Residence Pattern

In mapping the residential areas, the same classification used for Kerrville was employed for New Braunfels. Here as in Kerrville the typical dwelling is the one-family frame cottage, and the Class II residences of medium size occupy the greater part of the built-up area. In the oldest residence sections on the borders of the business district some of the old style cottages still retain not only their distinctive architecture but their immaculate graveled yards as well. Usually there are shrubs or flower beds set into this white expanse and bordered by bricks turned on edge.

The residence pattern is most compact in the older section around the business district and at the center of Comal Town (Fig. 23). Its extension over the hill and the terraces to the south, onto the escarpment in the north, and over the lower terrace levels along the Comal and the Guadalupe in Comal Town has left many vacant lots at the inner margins and a preponderance of vacant land at the fringes of these areas.

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[1] Information from the Katy agent at New Braunfels.

The distribution of the different classes of residences shows considerable mixture in several localities, but especially along the two main links between the plaza and the federal highway, where the commercial establishments are also present. Not only are the medium and poorer quality residences mingled here, but also the best quality houses are found. The latter are all grouped within three or four blocks of the plaza, and their architecture identifies them with an earlier generation in the town's building rather than the most recent development. Fairly solid blocks of Class II residences extend south from the plaza, and considerable patches occur elsewhere. Class III residences are clustered in one area at the extreme southwest and in smaller stretches at one or two places along the railroads and near the Guadalupe. Class I residences are scattered along the main streets down town, along the Comal Springs both on the terrace and on the cliff above, and along the road extending from the escarpment face onto the smooth slopes beyond.

Boerne and Comfort

The towns of Boerne and Comfort are considered together because of their many similarities and because the county statistics express collectively their characteristics, together with those of the county's small villages.

Both towns were laid out in 1854 to become the trading centers of farming and ranching country, and both have been county seats.[1] Comfort held this governmental function briefly between 1860 and 1862, while Boerne has retained it from the organization of Kendall County in 1862 until the present. With the arrival of the railroad in 1887, more land was cleared in the vicinity of the towns and such commercial products as cotton and wool were sent beyond the county limits through these shipping centers.[2] Resort business also developed, and by 1904 the Texas Almanac was listing both towns as amusement centers and health resorts for pulmonary diseases.

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[1] Real, op. cit., p. 77, and "District Program for Kendall County Soil Conservation District, Texas."

[2] "District Program for Kendall County Soil Conservation District, Texas."

Because Comfort is unincorporated and Boerne had only 1,261 people[1] in 1940, statistics for the individual towns are not available in many categories. The county statistics are quite suggestive however. It is interesting that urban pursuits yield about two-thirds of the county's determinable gross income[2] while employing only about one-third of the county's labor force.[3] An indication of the phase of the urban pursuits which dominates in Kendall County's towns may be gathered from the fact that retail trade employs three-quarters of those engaged in trade and service activities.[4] The evidence collected in the field bears out the statistical data.

Of the two towns, Boerne is the larger, its present size being estimated at 2,500 by the chamber of commerce, while a contemporary estimate for Comfort is 1,000.[5] As would be expected both from its size and its governmental function, Boerne also has more business establishments and a greater array of professional services.

Site and Situation

As in other respects, so in site and situation the towns of Comfort and Boerne are similar. Both are off-center with respect to the county's outlines, but dominate the two largest areas of cultivated land in the county. Comfort, standing in the larger expanse, has Center Point and Kerrville to the west, and is unchallenged on the east, while Boerne has no rivals within the smaller arable area along the Cibolo. However, Boerne is only thirty miles from the regional capital, San Antonio, and Comfort is forty-six miles from it. Within Kendall County the other towns are small enough to be in many respects tributary to Comfort and Boerne, but beyond the county limits there are larger towns which rank as rivals. Bandera lies twenty-four miles west of Boerne; New Braunfels, however, is a full forty miles to the east. Fredericksburg stands twenty-three miles north of Comfort, and the western rivals are Center Point and Kerrville, eight miles and nineteen miles away, respectively.

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[1] Sixteenth Census of the United States: 1940. Population, Vol. I, p. 1051.

[2] The determinable gross income was derived by totaling the value of agricultural products, the sales of retail and wholesale stores, and receipts of service establishments. The last three items were classed as urban. No figures were available for manufactures. The data were taken from Sixteenth Census of the United States: 1940. Census of Business, Vol. I, Retail Trade: 1939, Part 3, p. 562; Vol. II, Wholesale Trade: 1939, p. 1010; Vol. III, Service Establishments: 1939, p. 256; and Sixteenth Census of the United States: 1940. Agriculture, Third Series, Texas, pp. 38, 46, 47.

[3] Computed from the County Data Book, p. 367, with all categories save "Agriculture," "Mining," and "Other" classed as urban.

[4] Computed from Sixteenth Census of the United States: 1940. Census of Business, Vol. I, Retail Trade: 1939, Part 3, p. 562; Vol. II, Wholesale Trade: 1939, p. 1010; Vol. III, Service Establishments: 1939, p. 256. The census of manufactures gives no figures for Kendall County because there were only two establishments.

[5] Texas Almanac and State Industrial Guide, 1947-1948, p. 137.

The sites of Comfort and Boerne are similar not only to each other but to those of Kerrville and New Braunfels as well. Like the other towns, they have their main business sections and most of their built-up areas on stream terraces, but their outer margins climb the slopes of adjacent hills. They differ, however, in being more closely associated with smaller tributaries of the Guadalupe rather than immediately on the main stream itself. At Comfort the Guadalupe stands very near the east end of town, where Cypress Creek joins it after skirting the south side of town. At Boerne, the Cibolo, with a tributary, cuts through the town, but its waters are many miles from their ultimate juncture with the Guadalupe. Neither of these smaller streams has incised its course so deeply as the Guadalupe, but the drop-off along the banks is quite steep in each case.

Basically both towns have a checkerboard street pattern. At Comfort the plan is much more regular and the built-up area more compact than at Boerne. Both patterns break off at the streams, sending only three or four street connections across.

Transportation Patterns

The railroad and the road patterns are quite different in character at both towns. The railroad, which is the same branch of the Southern Pacific System that terminates at Kerrville, forms a short extension from the main line at San Antonio. Its pattern at each town is very simple. There is a single siding at the station in Boerne (Fig. 24). Comfort has in addition to the spur beside the station, a second line extending along the north side of town (Fig. 25).

The road pattern around the towns is, naturally, much more

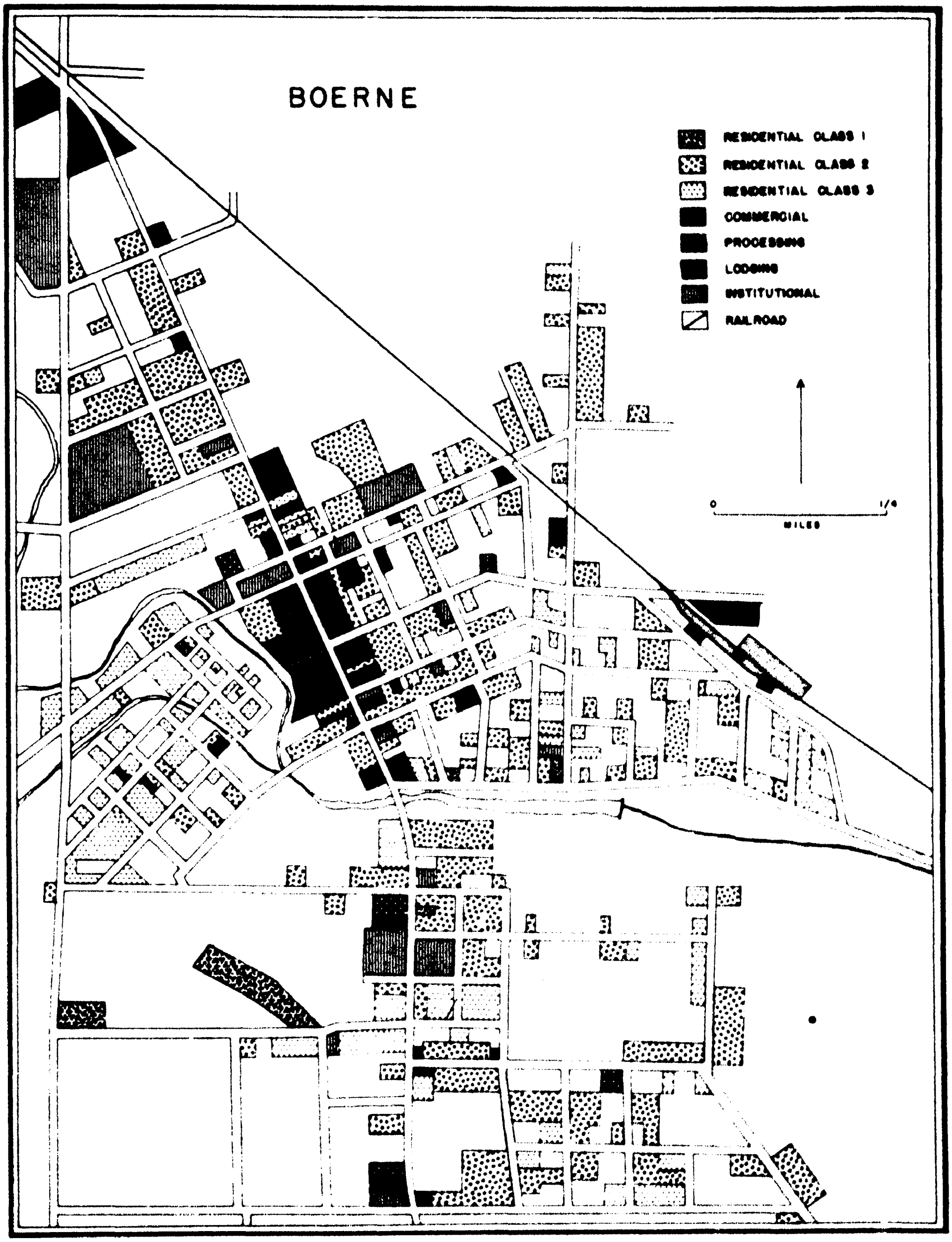
BOERNE
RESIDENTIAL CLASS 1
RESIDENTIAL CLASS 2
RESIDENTIAL CLASS 3
COMMERCIAL
PROCESSING
LODGING
INSTITUTIONAL
RAILROAD
0
1/4
MILES

Figure 24

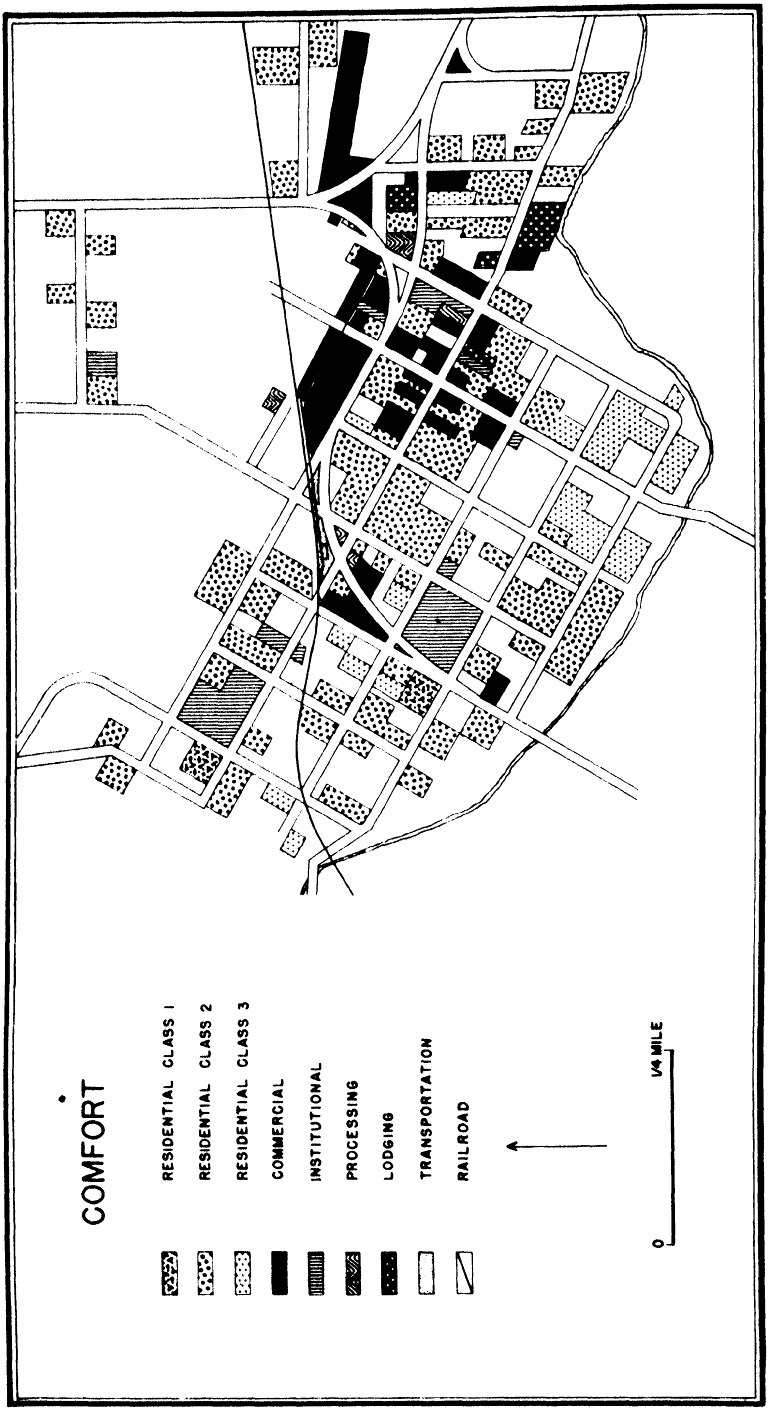
COMFORT
RESIDENTIAL CLASS 1
RESIDENTIAL CLASS 2
RESIDENTIAL CLASS 3
COMMERCIAL
INSTITUTIONAL
PROCESSING
LODGING
TRANSPORTATION
RAILROAD
0
1/4 MILE

Figure 25

elaborate. A federal highway takes a general north-south course through the county, meeting in Comfort a state highway which swings west to Kerrville. The broad course of the federal highway is conspicuous both in the towns and in the countryside. It constitutes the main street of Boerne, and with the state highway carves a great triangle in the north part of Comfort. Local roads in considerable numbers focus on the two towns making them prominent features in the road pattern.

The facilities which operate over these lines are similar to those at Kerrville. Both towns have daily railroad freight service to and from San Antonio.[1] As at Kerrville, the volume of incoming carload shipments is much greater than that shipped out, and the incoming shipments show little seasonal fluctuation. According to one highway carrier the L.C.L. shipments likewise show a preponderance of incoming freight.[2] This apparent lack of balance in the shipments of goods in a raw-materials producing area results from the operations of private trucks and trucking concerns without schedules. Over the highway network Comfort and Boerne are served by three motor freight lines which operate from San Antonio into the hill country. Passenger service along the highways toward Kerrville and San Antonio is furnished by the Kerrville Bus Company.

Commercial Pattern

The commercial patterns of Comfort and Boerne are linked with the transportation patterns in distribution as well as in function. In Boerne the main business district of town is strung out along the highway, which is also the main street, with the greatest concentration of stores in the few blocks north of the stream (Fig. 24). The scattered commercial establishments outside of this section include cafes and filling stations, together with a cedar yard and a locker plant, at the north end of the main street, filling stations and a cafe at the south end, oil storage tanks and cedar yards along the railroad near the station, and a laundry, a wool yard, and a bowling alley scattered through the residence section.

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[1] Information from the Southern Pacific agent at Boerne.

[2] Information from the Southern Pacific Transport agent at Boerne.

The commercial pattern of Comfort, like its area, is more compact than that of Boerne (Fig. 25). The older shopping center follows an older highway route near its entrance into town from the east. Here the bank, the clothing stores, the drug stores are found, along with grocery and hardware stores and others. Between the state highway, which loops from the triangle west and south through the town, and the railroad, extends another portion of the commercial pattern. It is distinguished by the presence of the railroad siding, along which two lumber companies, a wool warehouse, a furniture store, and a gas and appliance store are aligned. Some of the construction in this block of buildings is quite new in appearance. Farther east and west along the highway are cafes and filling stations, and east of the triangle, a large hatchery.

In the number and variety of its business establishments Boerne exceeds Comfort. There are, for example, more automobile agencies at Boerne, and some things, such as notions, which are sold in grocery and other stores in Comfort, support separate shops in the larger town. Nevertheless, from the information available, there appear to be more commercial concerns in proportion to the population in Comfort than in Boerne, and Boerne has nothing comparable to certain of the establishments along the railroad siding in Comfort. Because it is the county seat, however, Boerne has some trading advantage over Comfort in the territory for which they compete.

The trading radius of Comfort is estimated by its chamber of commerce to be approximately twenty miles, but it is not the same in all directions. It extends farther north and east than toward its rival towns on the south and west. The traffic divides, which suggest the core territory, are found eight miles to the west toward Kerrville, eight and a half miles north toward Fredericksburg, and six and a half miles southeast toward Boerne.[1] Along the road that strikes east from Comfort, the first divide is found about nine miles from the town, but if the local traffic divides of Sisterdale are ignored and the figures on the stretches of road away from the towns are considered, the divide appears to be at a distance of about twenty-two miles east of Comfort. Undoubtedly the nearer divide would represent the territory over which Comfort has a stronger hold while the more distant one would indicate territory shared with Boerne.

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[1] In determining the traffic divides for Comfort and Boerne, the "General Highway Maps" for Kendall, Comal, Blanco, Gillespie, Kerr, Bandera, and Bexar counties were consulted.

According to the chamber of commerce at Boerne the town's trading radius extends outward fifteen to twenty-five miles in different directions, being shorter to the northwest toward Comfort and longer to the northeast toward Kendalia. The location of the traffic divides bears out this proportion.[1] To the northwest toward Comfort the divide is nine miles from Boerne; north to Sisterdale, twelve and a half miles; northeast toward Kendalia, twenty miles; east toward New Braunfels, seventeen and a half miles; and south toward San Antonio, four and a half miles. Only one road extends west from Boerne across the county line toward Bandera, and its traffic figures are inconclusive.

Processing Pattern

Scattered through the business district of Comfort and on the outskirts of Boerne's commercial section are several processing establishments which generally serve the local communities and their trade areas. Both towns have newspapers, blacksmiths, ice companies, and feed mills, but in addition Comfort has two creameries and an awning company.

Resort Pattern

The resort pattern of Comfort and Boerne is somewhat restricted in development. In Boerne there are two hotels of attractive appearance, one being an old stone structure a part of which is seventy or eighty years old. This hotel faces the plaza near the main street, while the other is on the main street south of the Cibolo. Three tourist courts stand in the south part of town, two on the federal highway and one on the old San Antonio road. In Comfort three small hotels follow the older road into town from the east, while one tourist court stands on the state highway near its juncture with the federal highway and a second is east of the town on the road paralleling the railroad. Though there are some summer tourists from the coast, and Boerne in particular has many Sunday drivers from San Antonio, some of whom stop for meals, the tourist business is not intensively developed as in Kerrville to the west.

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[1] Ibid.

Institutional Pattern

The institutional pattern of Comfort includes the usual community facilities, school, churches, and park, with water works in process of being installed.

Boerne has facilities which serve both the community and the county. In addition to schools, churches, and utilities, it maintains a hospital and a swimming pool for the town's use. Other elements of the pattern which have a county-wide function are the county courthouse, with such offices as those of the judge, the sheriff, and the county agent, and, in the business district, the offices of the Soil Conservation Service and the Production and Marketing Administration.

Residential Pattern

The classification of residential types used for Kerrville and New Braunfels is also employed for Comfort and Boerne. As in the other two towns, the residences are virtually all one-family houses, however the yards are quite large, small lots being found only in a few blocks along the main streets near the shopping centers. In addition, there is much open land in the residence area used for gardens, for pasturing cows, and even for plowed fields.

In Comfort, most of the residential area is blocked up in the Class II category, but Class III properties are found in one group near Cypress Creek in the southern part of town, and in another cluster near the state highway and the railroad in the western part of town. Class I residences stand among the other types in the western section of town.

In Boerne there is a considerable mixture of types. Class II residences extend along the main street and spread outward along the streets that are normal to it. Class III houses show a concentration in the west central part of town, where there is considerable new building, but are also found in patches near the railroad to the east, and in the south part of town. The Class I residences are near the crest of a prominent hill which overlooks the Cibolo, and on the main street where it descends the hill. New construction is not confined to the western part of town, but also occurs in the southeast, and in the northeast beyond the railroad.

Site qualities do not appear to have a great deal of influence on residential qualities in these two small towns. The railroad, carrying only two trains a day, is not regarded as a nuisance, and even the busy highway which cuts through the towns is followed by all classes of residences. In a like manner, the presence of stores produces no deterioration in the upkeep of the adjacent houses. Since the small town shopping district produces so little of the congestion and noise associated with the city business district, the difference in their effects on residential values seems consistent with the circumstances.

Conclusions Concerning the Urban Pattern

The keynote in the development of the four large Guadalupe towns appears to have been a satisfactory growth in recent decades without boom conditions and subsequent deflation. The growth seems to have been more rapid in the two larger towns than in the two smaller ones. Although some vacant lots occur in the towns, there is no indication of overexpanded street improvements or building construction. Throughout the four towns, vacancies in both business and residence structures are of rare occurrence. Furthermore, architectural types suggesting a number of different decades are in the great majority of the cases in good repair.

The stagnant or declining conditions that obtain in the majority of the Class I towns have been discussed previously. With good roads and fast motor transportation these smallest trading centers have generally been unable to compete with the larger towns which offer a wider selection of goods. Ordinarily the towns of Class I retain only the stores supplying day-to-day necessities, in the purchase of which convenience outranks a varied selection.

Of the Class II towns, one, located at a point where the trade territories of Kerrville and Comfort meet and overlap, has a declining business district, but a well kept residence section. The other, standing near the upper limit of the cultivated terrace lands with no rival towns of comparable size for some distance to the west, shows recent growth in its business district as well as in the residential area.

Generally, the field evidence indicates a satisfactory functioning of the urban pattern in the Guadalupe Counties.

Statistical evidence of the above statement appears in the low percentages of unemployment in the Guadalupe Counties. In 1930, less than 2 per cent of the total population of each county was listed as unemployed. In 1940, those recorded as seeking work and being on public emergency work did not exceed 8 per cent of the total population in any of the counties.

Since these figures extend back nearly two decades, the generally thriving conditions observed in the field have not been merely the product of the current prosperity. The towns like the ranches and farms are feeling the stimulating effects of prosperity; but, in addition, are finding that there are some drawbacks. In each of the four main towns, business men commented with regret on the purchase of Hill Country ranches by wealthy outsiders because it meant considerable loss of business to the local concerns. More expensive and durable goods such as furniture and clothing are purchased elsewhere by these people and only the smaller items bought locally.

CHAPTER V

FINDINGS AND CONCLUSIONS

The scope of this chapter is restricted to findings and conclusions concerning the distinctive features of the major patterns, the chief problems of the area, and the characteristics in which the area is representative of the regions of which it forms a part.

1. The land resource of the Guadalupe Counties includes a narrow strip of the Black Prairie Region which is relatively homogeneous in use capability; a broad section through the dissected hill country which forms the eastern part of the Edwards Plateau, and is characterized by a diversified landscape of divides, slopes, and river terraces; and a narrow section of the fairly uniform area of level to rolling upland which constitutes the main divide of the Edwards Plateau.

2. The Balcones Escarpment, one of the most conspicuous regional boundaries in Texas, shows a particularly distinct outline in Comal County, where there are few spurs and deep reentrant stream valleys. In Comal County as elsewhere along its length appear the great springs, the towns, and the transportation lines associated with it.

3. The railroad pattern of the counties displays in miniature features characteristic of wider regions. In the Guadalupe Counties as in other parts of the Edwards Plateau and Black Prairie main lines follow the trend of the Prairie and avoid the Hill Country, the location of these lines close to the base of the Balcones Escarpment being typical of one important route in Texas. The branch which penetrates the Hill Country from San Antonio to Kerrville is one of several similar branches in the Edwards Plateau. In the reduction of service along this line, and in the discontinuance of the Fredericksburg and Northern, the Hill Country railroad pattern reflects a trend toward the replacement of branch lines by highway services. This trend is general among Texas railroads.

4. The highway pattern is quite well developed in the Hill

Country, but roads are even more closely spaced in the Prairie, while the Divide has rather widely spaced public roads. Throughout the Guadalupe Counties the construction of this network of good roads, together with the increased use of automotive transport, has been a major factor in the trends of farming and ranching systems, of resort development, and of the growth and decline of towns.

5. Both road and railroad patterns make local concessions to slope, but follow rather direct routes between towns.

6. The two major quarries of the Guadalupe Counties were localized along the Balcones Escarpment by the initiative of New Braunfels business men, and by the presence of suitable limestone and railroad transportation at the sites chosen. Additional advantages are the cheap power, fuel, and water supply available. A large area is served by the crushed rock, lime and other products of the quarries and their associated plants, one of the latter shipping to many parts of Texas while the other operates in Texas and seven other nearby states. In spite of this wide trade territory the quarrying pattern provides only a small percentage of the total employment in the Guadalupe Counties.

7. The ranching and farming pattern is one of the major pursuit patterns of the Guadalupe Counties from the standpoint of population support as well as areal spread.

8. The chief ranching and farming types which in their distributions make up the pattern are differentiated by their natural features as well as by their systems of operations. Hill Country agriculture is divided into two subtypes, farming, in which cropland and its products are important, and ranching in which they are insignificant or lacking. In the former case the enterprise is generally directed toward the production of beef calves, lambs, wool, mohair, and feed crops. In the latter case the feed crops may be small in amount or lacking entirely, and in many instances there is no sale of lambs. The ranching type found in the Divide appears to be a transition from the smaller scale operations of the Hill Country to the larger scale ranches of the western Edwards Plateau, but the two clearly belong to the same major ranching type. On the Prairie, cropland and temporary pasture predominate, with corn, sorghum, and cattle leading among the products of the farms. All lines of evidence including the settlement pattern point to a much greater intensity of land use than that found in the Edwards Plateau.

9. Though the agricultural patterns have been developing in the Guadalupe Counties for a hundred years, major changes are still being made. On both farms and ranches the recent alterations in the crop and livestock associations involves a change in the emphasis on species already known rather than the introduction of entirely new species. However the shift affects such products as wool and cotton which are, or have been, leading sources of income in the farming and ranching systems.

10. The resort pattern, which is associated with the Hill Country, shows a high degree of localization, with the greater number of the resorts in Kerrville and the upper forks of the Guadalupe. Two of the types, church encampments and sanitariums, are found only in this area, but the remaining classes are represented by a scattering of resort establishments through the remainder of the area.

11. The resort business is a major factor in the support of Kerr County, but is apparently less important, as well as less intensively developed, in the other two counties.

12. The Guadalupe Counties serve as a summer resort for Texas people, especially for those from the Gulf Coast area. The attractions of the resorts include hill scenery, clear streams, nearness, and established facilities and reputation. In addition, the lower relative humidity is a major consideration for the people from the coast, and the abundance of deer and wild turkeys draws many hunters to the area in the autumn.

13. The urban pursuits are of great importance in the support of the Guadalupe Counties, and through the services they render, in the functioning of the other pursuits.

14. The towns which form the urban pattern classify into four categories on the basis of functions and approximate size. Classes I, II, and III comprise towns which are primarily trading centers for the lands in their vicinity, the distinction between the categories being a matter of the size of the towns and the diversity of their trading concerns. The two largest towns, belonging to Class IV, have added resort or manufacturing specialties to their country trade.

15. In the irregular pattern formed by the distribution of the towns, the area included in the eastern part of the Guadalupe Counties is distinguished by the prevalence of the smallest size towns. These are closely spaced in the Prairie, but farther apart

in the Hill Country. The western part of the Guadalupe Country has fewer but larger towns. In the majority of the cases towns are associated with cultivated land, the four largest towns standing in the largest areas of arable land.

16. In their sites and street patterns the minor towns are diverse, but the four major towns are similar. In the former the diversity is expressed in the nature and degree of regularity of the street plans, in the relation of the street plans to the road and railroad patterns, and in the range of land types on which the towns have been built. In the latter, checkerboard patterns are developed with greater or lesser regularity on terraces of the Guadalupe River or its tributaries.

17. The commercial patterns of the major towns show resemblances in the possession of distinct shopping centers, together with a scattering of shops outside of these districts, and in the assymetrical shapes of their trading areas.

18. Resort facilities in the towns generally take the form of lodgings, but Kerrville, with its church encampments and sanitariums, and New Braunfels, with the Comal Springs, have additional features of importance.

19. The manufacturing development of New Braunfels is unique in the counties and holds a prominent place in the employment structure of New Braunfels and Comal County. Among the advantages it enjoys are satisfactory labor, cheap fuel and power, and good transportation. The area to which its largest plants distribute their products is much greater than the trading territory of the service functions of the town.

20. In general the pursuit patterns appear adequate to serve the functions of the area, but there are some indications of maladjustments which have an adverse effect on the prosperity of the operating units, and of problems which arise largely from inherent physical conditions, though in some cases they are aggravated by the way in which the natural resources have been used. (a) In the urban pattern, although the larger towns appear to be prosperous, the smallest ones seem to be dwindling or just holding their own. Since better transportation has made more diversified shopping centers accessible there is probably no remedy for this condition. (b) The resort business suffers from marked seasonal use of its facilities. Only during the three summer months does it approach a capacity operation. (c) Towns, resorts, ranches, and farms, all are affected to some degree by the flash

floods which occur in the area. (d) Coupled with this excessive runoff, and with other factors are the problems of soil erosion, water loss, and water deficiency. (e) Even more immediate in their effects on the operator are the low and variable crop yields, and the poor range conditions which characterize large areas as a result of overstocking and the spread of brush. And (f) locally water for domestic purposes and for livestock is either difficult or expensive to obtain on rural properties.

21. Some attack has been made on the land use problems and maladjustments, but generally progress has been slow, while some projects are still in the planning stage. Through the organization of soil conservation districts for all of the Guadalupe Counties, expert advice and technical assistance has been made available, in addition to that supplied by the county agents, for the improvement of range and cropland. The Production and Marketing Administration implements the work of conservation through its financing programs. However the co-operators in the individual conservation programs constitute a minority of the total number of ranch and farm operators, and the area affected by the conservation measures is limited correspondingly. Although water deficiency and soil erosion, with their effects on crops and range, may be mitigated by conservation measures they probably cannot be eliminated from the environmental complex because they are in part derived from certain unalterable physical conditions such as steep slopes and shallow soils in the Edwards Plateau, and torrential rains and excessive evaporation throughout the area. Flash floods, which represent excessive runoff in an acute form, might be restrained from damaging some of the lands downstream even though little can be done to prevent the havoc they cause in the areas where they originate. Studies of the problem have been made by the army engineers in some parts of the Guadalupe basin and are in progress in other sections, with tentative recommendations for the construction of dams at several sites. However, no construction work appears imminent.

22. Not only the problems and the inherent features of the Guadalupe Counties, but their regional relations as well are of geographic interest. In natural features, systems of ranching, and transportation patterns the Guadalupe Counties are fairly representative of the eastern part of the Edwards Plateau. The presence of the resort function in one form or another is also characteristic of this subregion. The narrow strip of prairie in

Comal County, however, differs from the main body of the Black Prairie in several important respects. Though it is similar to the rest of the major region in landforms, soils, and water supply difficulties, the Comal Prairie contrasts in climate and dominant crop. It is located on the dry southwestern part of the Black Prairie and has carried the trend toward replacement of cotton acreage by feed crops farther than have representative counties in the main section of the Black Prairie.

23. In the complex of Texas, then, the Guadalupe Counties may be characterized as belonging largely to the Edwards Plateau, with its distinctive set of products and system of ranching. More specifically they constitute a part of the eastern border, the hill country, which serves as a playground and health resort for the surrounding plains. A noteworthy contrast between the economy of Texas and that of the Guadalupe Counties is the relatively small place held in the latter by resources which are necessarily exhausted by exploitation. Only the limestone extracted by the quarries belongs to this category. Although the cheap fuel, piped in from sources outside the counties, is of great importance to the Comal factories, the remainder of the pursuits and facilities of the Guadalupe Counties are based directly on resources which will be depleted only through a failure to exercise due care in their use.

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Texas State Highway Department. "General Highway Map." Prepared in co-operation with the United States Bureau of Public Roads. Data obtained from State-wide Highway Planning Survey. Sheets for Comal, Kendall, and Kerr counties. Date: 1936. Scale: *ca.* one inch to one mile. (Blue-line prints.)

———. "General Highway Map." Prepared in co-operation with the United States Bureau of Public Roads. Data obtained from State-wide Highway Planning Survey. Sheets for Bandera, Bexar, Blanco, Comal, Edwards and Real, Gillespie, Guadalupe, Hays, Kendall, Kerr, and Kimble counties. Various dates. Traffic volume data for 1941. Various scales. (Blue-line prints.)

U.S. Army, Corps of Engineers. *Tactical Maps.* Quadrangles for Boerne, Center Point, Comfort, Hunter, Medina Lake, New Braunfels, and Tuff. Various dates. Scale: 1:62,500.

———. *Topographic Quadrangles.* Bracken, and Leon Springs Military Reservation. Dates: 1945 and 1943. Scales: 1:50,000 and 1:25,000.

U.S. Bureau of the Census. *United States Population Density Map by Minor Civil Divisions: 1940.* 2 sheets. Scale: 1:2,500,000.

U.S. Geological Survey. *Topographic Quadrangles.* Fredericksburg, Kerrville, and Smithson Valley. Various dates. Scales: 1:62,500 and 1:125,000.

Zoning Map of the City of Kerrville, Texas. Date: 1946. Scale: *ca.* one inch to 740 feet.

Aerial Photographs

U.S. Production and Marketing Administration. Index Sheets for Comal County. Date flown: 1938. Scale: *ca.* two inches to one mile.

U.S. Soil Conservation Service. Index Sheets for Kendall and Kerr Counties. Date flown: 1945. Scale: *ca.* two inches to one mile.

U.S. Soil Conservation Service. Vertical photographs in Comal, Kendall, and Kerr Counties. Dates flown: 1938 and 1945. Various scales.